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SPIROCHETAL JAUNDICE

A REPORT ON FIFTEEN CASES, INCLUDING TWO CASES OF LEPTOSPIRA CANICOLA INFECTION

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AND
J. R. SNAVELY, M.D.
NEW ORLEANS

Spirochetal jaundice has been reported from practically every country in the world.[1] Despite its universality, the number of cases reported in North America appears to be disproportionately less than that reported from continental Europe. In the interval 1924-1937 808 cases were diagnosed in the Netherlands.[1] Between 1924 and 1932 263 proved cases were found in France.[2] In the Netherlands the diagnosis was established in 374 cases between 1924 and 1938, and there were at least 248 cases in Great Britain between 1922 and 1939.[3] In contrast, up to 1940 Stiles and Sawyer [4] state that they were able to collect only 73 authentic cases from North America, with half as many additional cases on which laboratory data were regarded as inadequate. Larsen [5] states that up to August 1941 98 cases of spirochetal jaundice had been observed in Puerto Rico and in fourteen states and the District of Columbia in the United States.

Many authors [6] feel that the condition is not rare in this country. Why then is the disease so infrequently diagnosed? In this article we wish to show that spirochetal jaundice has been overlooked in the past, to emphasize certain interesting features of the disease which have come under our observation and to point out some of the problems in differential diagnosis which occurred in 15 cases that were recently observed at Charity Hospital.

It is most certain that vectors harboring leptospira are not lacking in the United States. Raven,[7] during the months of May and June 1941, found positive agglutinations for leptospiras in 28 per cent of serums collected from dogs in Philadelphia. Serums of dogs from rural communities in Pennsylvania showed 38.1 per cent positive agglutinations.[7] In these animals data relative to clinical history were not available, so that it was impossible to tell whether a clinical or a subclinical infection had preceded the seropositive reactions. Serologic tests performed on supposedly normal dogs in San Francisco and northern California gave positive reactions in 34 per cent.[8] In this study, 14.3 per cent of dogs from a rural community showed latent infection. Blood of dogs from Louisiana, Nebraska, New York, Pennsylvania and Virginia were reported as giving positive agglutinations for Leptospira icterohemorrhagiae.[9]

Rats have been found to be infected to no less an extent in the United States. Sampling of 467 rats in San Francisco yielded renal leptospira by dark field examination in 176 instances (35 per cent). Meyer and his associates [8] state that renal leptospira infection has been definitely established: in Washington, D. C., 10 per cent; in Nashville, Tenn., 10 per cent; in New York, 17.2 to 21.9 per cent; in Albany, N. Y., 40 per cent; in Baltimore, 7 per cent; in Chicago, 3 to 5 per cent; in Rochester, N. Y., 38 per cent, and in Detroit, 16 per cent.

Recently, examination of mine water and muck revealed leptospiras morphologically indistinguishable from Leptospira icterohemorrhagiae in a single mine in Alabama where 14 human cases of spirochetal jaundice occurred in a period of two and a half years.[10] Nonpathogenic saprophytic spirochetes occur in natural waters all over the world.[1] Although there is a disagreement concerning this possibility, apparent transformation of nonpathogenic strains to virulent forms after culture or animal passage has been described.[11]

It might be supposed that the murine strains which have been found in such a large proportion of American rats were nonpathogenic. However, Langworthy and Moore [12] have demonstrated that strains in New York State were virulent.

In addition to the rat and dog, it has been shown that leptospirosis may occur in field mice, cats, pigs, foxes and horses.[2] Although leptospiras have not been demonstrated in these animals in the United States, it may be assumed, with the proportion of infected dogs and rats that has been demonstrated, that leptospirosis is present in these animals in at least a moderate percentage.

It has been pointed out by Ashe [2] that North Americans are not immune. The occupations which are described as being commonly affected in Europe are in the main the same for the reported American cases. It is our impression that typical cases of spirochetal jaundice have always been present in Louisiana if not

From the Department of Medicine, Tulane University of Louisiana School of Medicine, and Charity Hospital of Louisiana.

1. Walch-Sorgdrager, G. B.: Leptospiroses, Bull. Health Organ., League of Nations **8**: 143, 1932.
2. Ashe, W. F.; Pratt-Thomas, H. R., and Kumpke, C. W.: Weil's Disease, Medicine **20**: 145 (May) 1941.
3. Greene, C. H., and Farrell, Elliston: Liver and Biliary Tract, Arch. Int. Med. **65**: 847 (April) 1940.
4. Stiles, W. W., and Sawyer, W. A.: Leptospiral Infection (Weil's Disease) as an Occupational Hazard, J. A. M. A. **118**: 34 (Jan. 3) 1942.
5. Larsen, C. L.: Weil's Disease in Puerto Rico and the United States, Pub. Health Rep. **56**: 1650 (Aug. 15) 1941.
6. Jeghers, H. J.; Houghton, J. D., and Foley, J. A.: Weil's Disease: Report of Case with Postmortem Observations and Review of Recent Literature, Arch. Path. **20**: 447 (Sept.) 1935. Walch-Sorgdrager.[1]
7. Raven, Clara: Canine Leptospirosis in Pennsylvania, J. Infect. Dis. **69**: 131 (Sept.-Oct.) 1941.
8. Meyer, K. F.; Stewart-Anderson, B., and Eddie, B.: Epidemiology of Leptospirosis, Am. J. Pub. Health **29**: 347 (April) 1939.
9. Packchanian, A.: Positive Agglutination Tests in Suspected Cases of Weil's Disease, Pub. Health Rep. **56**: 2145 (Nov. 7) 1941.
10. Lester, B. S.; Denison, G. A., and Posey, L. C.: Weil's Disease, South. M. J. **35**: 325 (April) 1942.
11. Buchanan, G.: Spirochetosis Icterohemorrhagiae, Brit. M. J. **2**: 990, 1927. Baerman and Zuelzer, cited by Walch-Sorgdrager,[1] p. 228.
12. Langworthy, V., and Moore, A. C.: A Study of Leptospira Icterohemorrhagiae, J. Infect. Dis. **41**: 70 (July) 1927.

the entire United States. Ideal situations for exposure exist for the trappers and fishermen and for the rice and cane field workers of southern Louisiana. Older clinicians have told us that in their opinion numerous cases of spirochetal jaundice have been confused with yellow fever in the past. In this connection it is an interesting commentary that Stimson [13] discovered, in 1905, "spirochetes" in the organs of a Louisianian dying from what was thought to be yellow fever. Such mistakes are not difficult to make because clinically and pathologically [14] spirochetal jaundice and yellow fever may be quite similar.

Ashe believes that the clinical manifestations are not well enough known in this country for the disease to be considered in the differential diagnosis. Other authors [15] feel that the diagnosis is chiefly dependent on the laboratory and that the fault lies in the fact that too few American laboratories are equipped to establish the diagnosis.

An occupational history has usually been present in the reported cases. In most instances a history of moist, damp or wet environment is obtainable. Frequently immersion, accidentally or intentionally, in a polluted stream, has resulted in the disease. Consequently, occupations commonly encountered in the disease are those of sewer workers, trapped coal miners, canal workers, fish workers, rice-field workers and cane cutters.

The disease is a severe one and is typically characterized by an acute onset which is associated with chills, headache and extreme muscle pain with nausea and vomiting. The majority of patients are prostrated. The amount of fever is variable, ranging from 99 to 104 F. Abdominal pain localized in the epigastrium or right upper quadrant is frequently a prominent feature of the disease. In the latter part of the first week jaundice and enlargement of the liver usually become apparent. Conjunctivitis and injection of the pharynx have been described by many authors. A moderate leukocytosis is usually present. Renal function is usually affected; oliguria, anuria, albuminuria, casts and cells may occur, and there may be retention of the nitrogenous factors in the blood. A hemorrhagic tendency or anemia is apparent in about half the cases. In seven to thirteen days there is improvement in the general symptoms and convalescence begins. In some instances a febrile relapse may occur at the beginning of the third week. Meningeal signs may be present.[16]

The diagnosis is essentially dependent on the laboratory.[9] The leptospiras can be found in the blood in the first stage (seven to thirteen days). Immune bodies can be found between the twelfth and the seventeenth day and are present in increasing concentration after this time. The organisms may be found in the urine after the second or third week. Inoculation of guinea pigs or hamsters after the technic described by Ashe [2] may facilitate diagnosis either from the blood or from the urine in the appropriate period. We wish to emphasize here the important work of Schultz,[17] who demonstrated the ease with which the inexperienced investigator may be misled in his interpretation by "pseudospirochetes" observed in dark field preparations of blood.

13. Stimson, A. M.: A Note on an Organism Found in Yellow Fever Tissue, Pub. Health Rep. **22**: 541, 1907.
14. Harris, W. H.: The Pathology of a Case of Weil's Disease with Comparative Study of Yellow Fever, Arch. Path. **34**: 663 (Oct.) 1942.
15. Jeghers, Houghton and Foley.[6]
16. Rathbun, H. K., and Waghelstein, J. M.: Weil's Disease: Report of Six Cases, Ann. Int. Med. **15**: 395 (Sept.) 1941.
17. Schultz, E. W.: The Pseudospirochetes Derived from Red Blood Cells, J. Lab. & Clin. Med. **8**: 375 (March) 1923.

CHARITY HOSPITAL CASES

Stimulated by the characteristic findings shown by 4 white male patients [18] studied in the Tulane Medical Service at Charity Hospital during August and September 1941, an attempt was made to ascertain how many cases of spirochetal jaundice had been overlooked in the interval Sept. 1, 1939 to Sept. 1, 1941. Accordingly the charts of 463 patients whose discharge diagnoses could possibly have been confused with spirochetal jaundice were reviewed. Of this number, 54 records were sufficiently suggestive to warrant recall of the patients for an agglutination test. Blood from 40 patients of this group was sent to the National Institute of Health. Three of the serums were found to have a diagnostic titer of agglutinins against Leptospira icterohemorrhagiae. The case histories of these patients follow in brief. Comparison with the other cases on a chart which outlines the salient features of the 15 cases recently observed at Charity Hospital show that the following 3 cases are typical. It will be noted that these[14] cases did not constitute an epidemic but occurred over a period of two and one-half years and in widely separated parts of southern Louisiana.

F. H. (case 5), a white man aged 58, a laborer, admitted to Charity Hospital on May 7, 1941, complaining chiefly of jaundice, had been noted as being icteric six days prior to admission. Four days later anorexia developed and later he became nauseated and vomited at frequent intervals. The vomitus was "streaked with red." Physical examination revealed that he was poorly nourished, asthenic and "yellow as a canary." He was acutely ill but afebrile. The sensorium was cloudy. There was old, clotted blood present about the mouth. The mucous membranes were soft and bleeding. The teeth were carious, and oral hygiene was poor. The pharynx was injected. The heart and lungs were normal. The remainder of the physical examination was negative except for small areas of hemorrhagic extravasation into the skin at various points over the body.

The red blood cell count was 3.5 million; the white blood cell count was 7,000 with 93 per cent polymorphonuclear leukocytes. The platelet count was 310,000. Urinalysis revealed 1 plus albumin and 1 plus bile. The blood urea nitrogen was 42.7 mg. per hundred cubic centimeters. The icterus index on admission was 195 units and rose to 300 units.

The patient was discharged on May 30 with the diagnosis of acute catarrhal jaundice. He was subsequently recalled, and blood submitted to the National Institute of Health on April 25, 1942 was reported as positive against Leptospira icterohemorrhagiae in a dilution of 1: 1,000.

C. B. (case 10), a white man aged 39, a farmer, admitted to Charity Hospital on July 31, 1940, suffered from "indigestion" after every meal one week prior to admission, with much abdominal pain and belching. On the following day fever developed and he had two chills which were associated with pain in the extremities, backache and a severe headache. The following day it was noticed that he was jaundiced. In the next few days he noticed that his urine had become red. On admission he was well oriented and presented well defined jaundice. The only positive physical conditions beside icterus were carious teeth and slight tenderness in the right upper quadrant.

The red blood cell count was 1.81 million. A fragility test revealed hemolysis beginning at 0.36 and completed at 0.24. Urinalysis revealed 2 plus bile. The icterus index was 100.

The patient was discharged on August 30 with a diagnosis of acute catarrhal jaundice. He was recalled on Jan. 30, 1942, and agglutinins were found against Leptospira icterohemorrhagiae in a dilution of 1: 1,000.

B. O. (case 11), a Negro youth aged 19, a porter, admitted to Charity Hospital on July 25, 1941, had been suddenly seized with a headache and generalized aches and pains five days

18. Wilen, C. J. W.; Snavely, J. R., and Bruno, F. E.: A Report of Recently Observed Cases of Weil's Disease, New Orleans M. & S. J. **94**: 338 (Jan.) 1942.

prior to admission. In a short while he became nauseated and vomited. Four days later his family noticed that his scleras were yellow. Because of the persistent nausea and vomiting the patient came to the hospital.

On admission his temperature was 99 F. The scleras were icteric and there were subconjunctival hemorrhages. There were a few palpable submaxillary nodes. A few crepitant rales were present at the base of the right lung. The liver was palpable two fingerbreadths below the costal margin. The remainder of the physical examination was negative.

The red blood cell count was 3.9 million. The white blood cell count was 15,700 with 82 per cent polymorphonuclear leukocytes. The prothrombin time was 73 per cent of normal. Urinalysis revealed 3 plus albumin and a trace of bile. Bile stained casts were present. The blood urea nitrogen was 77.7 mg. per hundred cubic centimeters. The icterus index was 50. On August 16 the patient was discharged with a diagnosis of acute catarrhal jaundice. The patient was subsequently recalled, Feb. 3, 1942, and agglutinins were found to be present in the patient's serum against Leptospira icterohemorrhagiae in a dilution of 1 : 10,000.

We believe that the following conditions have been most commonly confused with leptospirosis: catarrhal jaundice, typhus fever, malaria, acute yellow atrophy, toxic hepatitis, amebic hepatitis, yellow fever and obstructive jaundice with associated cholangitis. In the first world war many cases of spirochetal jaundice [1] were described as occurring in French, Italian, British and German troops. Undoubtedly if trench warfare is resorted to in this war numerous cases will develop in rat-infested trenches which are frequently contaminated with stagnant water. It has been shown [19] that leptospiras can live for a period longer than three weeks in stagnant water that is slightly neutral or alkaline.

BRONCHOPULMONARY FEATURES

A point which deserves further emphasis is the ease with which the disease can be confused with acute pneumonia. The sudden onset with chills, fever, cough and expectoration of sputum, which is often blood tinged, combined with physical and radiologic evidences of pulmonary infiltrations, can be indistinguishable from atypical bacterial, virus or influenzal pneumonia. The diagnosis is especially difficult in the anicteric or preicteric case. The development of icterus in such a severely ill patient, especially if it is associated with myalgia, hemorrhagic tendencies and appropriate urinary findings, should strongly suggest spirochetal jaundice. If jaundice appears several days after the institution of sulfonamide therapy, the diagnosis of toxic hepatitis as a complication of either pneumonia or sulfonamide therapy may be easily entertained and the true condition overlooked. Just this sequence of events occurred in 4 of our cases.

An illustrative case is the following:

H. G., a man aged 34, a warehouse workman, became suddenly ill with fever, chills and headache on Aug. 18, 1941. He began to expectorate blood tinged sputum within a few hours and was treated for pneumonia by a physician who gave the patient sulfathiazole. This medication was discontinued on the fifth day of his illness because of the appearance of well defined jaundice. During this time there were repeated chills and fever to 104 F., and the patient was disoriented at times. Urine was noted to be very dark brown, but at no time was oliguria observed. The patient was admitted to the hospital on the ninth day, at which time his pulse was 120, respirations 24 and blood pressure 130/20-0. Save for deep icterus and a barely palpable tender liver, there were no positive physical manifestations on admission. The white blood cells numbered 12,400 with 85 per cent polymorphonuclear leukocytes. The urine showed 4 plus bile and urobilinogen to a dilution of 1 : 10; the icterus index was 333 and the blood urea nitrogen was 80. For four weeks in the hospital the patient's condition ran a continuously febrile course with chills and fever to 104 F. Repeated small transfusions were given, and near the middle of the fourth week of illness 250 cc. of blood from a patient who had recovered from spirochetal jaundice two years previously was given. No dramatic results followed, but the patient's temperature gradually fell until near the end of the sixth week he became afebrile and definitely convalescent. On the twenty-third day of illness the patient's serum agglutinated Leptospira icterohemorrhagiae to 1 : 100,000 and on the thirty-fourth day to 1 : 1,000,000.

CENTRAL NERVOUS SYSTEM FEATURES

The meningeal form of leptospirosis was discussed in detail by Walch-Sorgdrager.[1] He states that it is characteristic of the meningeal form that there is nothing to suggest spirochetal jaundice. There are variable degrees of meningeal signs and symptoms in the cases reported. The spinal fluid is usually under increased pressure, it is nearly always clear, it is weakly positive for albumin and the number of cells is increased. Blood agglutination tests are positive. Forty-three per cent of our patients had a severe headache, and, of the 14, 4 had delirium or a severe degree of restlessness. Spinal puncture in 2 cases was negative. Patient 12 was disoriented and had a convulsion followed by weakness of the right hand. Lumbar puncture was not performed in this instance.

VARIATION IN SERUM TITER

In the majority of our patients the titer of agglutinins increased as convalescence occurred. In 1 case (L. D., case 14) the titer dropped from 1 : 1,000 to 1 : 100 in twenty-one days. In another (A. E., case 9) agglutinations on blood were positive in a dilution of 1 : 30,000 in October 1939. When the patient was recalled on Jan. 19, 1942 the agglutinations were negative. As can be seen from the following brief report, this history is typical for spirochetal jaundice:

A. E., a Negro youth aged 19, a laborer in the rice fields and a trapper in the off season, admitted to Charity Hospital Oct. 10, 1939, became acutely ill five days prior to admission. He was seized with epigastric pain which shifted to the right upper quadrant. This was associated with chills, fever, nausea and vomiting. There were severe muscle pains and headache. On admission, the patient had herpes and conjunctival hemorrhages and he became definitely jaundiced. On admission the pharynx was hyperemic. The base of the right lung was dull to percussion, and tubular breathing was thought to be present. The liver was palpable. The white blood cell count was 18,300 with 86 per cent polymorphonuclear leukocytes. Blood urea nitrogen was 22.4. The icterus index was 300 units. Urinalysis revealed 3 plus albumin, 3 plus bile, 3 to 5 red blood cells and white blood cells with an occasional bile-stained cast per high power field. The electrocardiogram was interpreted as showing evidence of myocardial damage with a slightly long PR interval and QT interval. Roentgenograms of the chest were negative. Serum sent to the National Institute of Health was reported as positive in a dilution of 1 : 30,000 in October 1939. The patient was recalled and serum taken on Jan. 19, 1942 was sent to the National Institute of Health and was reported as negative.

This shows that the power of agglutination can be lost in spirochetal jaundice and suggests that perhaps immunity may likewise be lost.

LEPTOSPIRA CANICOLA INFECTIONS

The serum in 2 of our cases (12 and 15) agglutinated against the Leptospira canicola in a dilution of 1 : 10,000 and 1 : 1,000,000 respectively and against the Leptospira icterohemorrhagiae in a dilution of 1 : 1,000 and

19. Davidson, L. S. P.; Campbell, R. M.; Rae, H. J., and Smith, J.: Weil's Disease, Brit. M. J. **2**: 1137 (Dec. 22) 1934.

1:1,000,000 respectively. Ashe in his comprehensive review on spirochetal jaundice states that up to May 1941 only 1 human case due to Leptospira canicola had been reported in the United States. Though our patients had no knowledge of contact with jaundiced dogs or other animals, it is interesting that in the three months prior to the illness of patient 12 local veterinarians [20] had observed at least 9 cases of icterus in dogs. Unfortunately we were unable to secure blood for agglutinations or tissues for examination from these jaundiced animals. Lester and his co-workers [10] in their investigation of an epidemic of spirochetal jaundice occurring in mine workers attempted to determine the possibility of dogs serving as a reservoir of infection. The examination of blood and tissue sections in jaundiced dogs provided by local veterinarians failed to demonstrate leptospira. Walch-Sorgdrager states that the canicola disease has certain special characteristics. Severe symptoms were uncommon and jaundice was rare. Meningeal symptoms occupied a prominent place in 4 of the 12 cases reported by him. Because of the rarity of Leptospira canicola disease, case 12 will be described in brief:

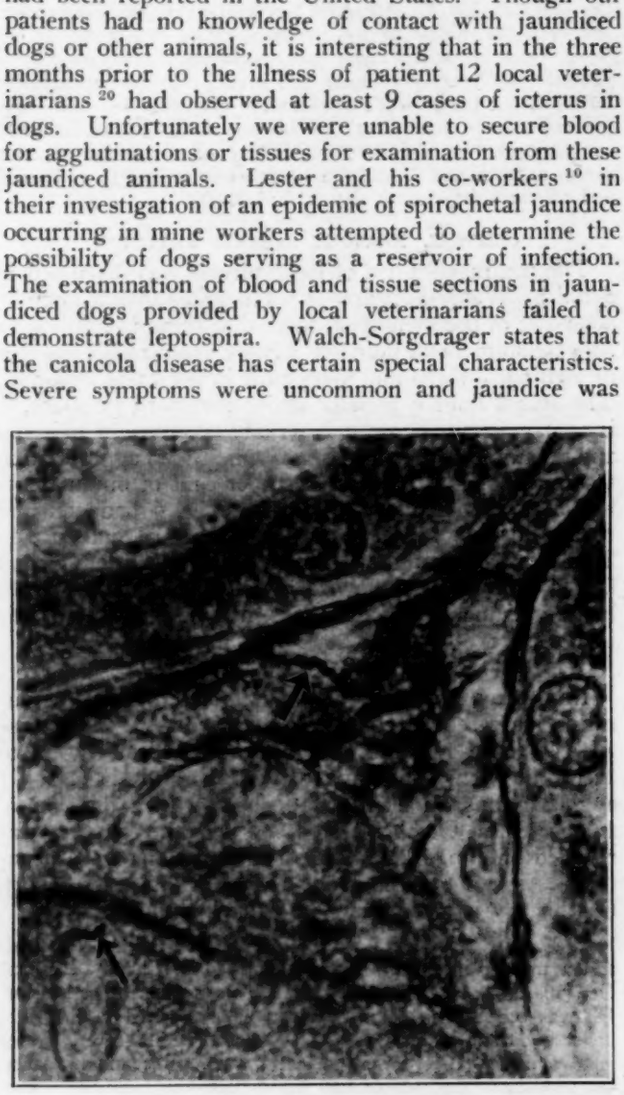

Fig. 1.—Section of kidney of O. D. Arrows indicate Leptospira.

E. R. (case 12), a white man aged 63, a night watchman, admitted to Charity Hospital March 25, 1942, stated that two weeks prior to admission he had an infection of the upper respiratory tract with mild malaise for a few days and only a slight cough. About ten days prior to admission his temperature was 102 F. The local physician who was called said he had a "touch of pneumonia" and gave him white powders and a cough medicine. His fever subsided in one or two days. In one week the patient's wife noticed that he had a yellowish tinge to his skin. At this time his urine became "red as blood." He was voiding small amounts of urine frequently. He made satisfactory progress until the day of admission, when his wife noticed that he was cloudy mentally. Shortly after this he had a mild convulsion. He regained consciousness in a few minutes but was mentally hazy on admission.

Physical examination revealed that he was well nourished and was uniformly jaundiced. There were numerous excoriations over the abdomen and back. The scleras were icteric and hyperemic. The oropharynx was injected. The lungs were clear and resonant. There was slight enlargement of the heart. The rate and rhythm were regular. No murmurs were heard. The liver was just barely palpable. The remainder of the physical examination was not worthy of note. The red blood cell count was 4,900,000, the white 13,600, with 65 per cent polymorphonuclears. Urinalysis showed 3 plus bile and an occasional white cell. The icterus index was 129 units. The blood urea nitrogen was 69.6 mg. per hundred cubic centimeters. On March 31 agglutinations performed by Dr. Elliston Farrell were positive in a dilution of 1:300 against Leptospira icterohemorrhagiae. A sample of serum sent to the National Institute of Health on April 14 was reported as being positive in a dilution of 1:10,000 against Leptospira canicola and 1:1,000 for Leptospira icterohemorrhagiae.

20. Waddil, Burg: Personal communication to the authors.

HEMORRHAGIC DIATHESIS AND GASTROINTESTINAL FEATURES

One of the essential pathologic features of spirochetal jaundice is a hemorrhagic diathesis which presumably results from a local toxic effect of the spirochete on the capillary wall. The prothrombin time of the blood may or may not be abnormal. Six of our patients had prothrombin determinations during the height of their illness. Four of these had an obvious hemorrhagic diathesis and the prothrombin determinations were 75 per cent, 83 per cent, 73 per cent and 100 per cent of normal, respectively. The determination of 100 per cent normal was made on patient 8, who had severe melena and hematemesis. Two patients who showed no evidence of a bleeding tendency had readings of 60 per cent and 95 per cent respectively. This hemorrhagic tendency may cause minute hemorrhages in the skeletal muscles, lungs, liver, stomach, pancreas, adrenals, peritoneum and spleen. In the more severe cases purpura, hematuria, hematemesis and melena may be present. Fully one half of our patients showed hemorrhagic phenomena. These manifestations consisted of purpura, petechial and subconjunctival hemorrhages, bleeding mucous membranes, hematemesis and melena, and 1 patient had a uterine hemorrhage.

As a consequence of these factors and notably from hemorrhage into the intestinal wall and an inflammatory reaction in the duodenum and around the ampulla of Vater, severe gastrointestinal symptoms may develop. All but 1 of our patients complained of abdominal pain. Rigidity of the abdominal wall was present in 4 cases, and in 9 cases nausea and vomiting were present for a varying length of time. Patient 8 had melena and hematemesis and required five blood transfusions. Patient 13 entered the hospital with severe abdominal pains, ragidity, nausea and vomiting. The leukocyte count was 50,000. The physical examination indicated an acute abdominal emergency, but the nature of the onset and course of the disease and our previous experience with spirochetal jaundice were the determining factors in a conservative policy. Twelve hours later the acute symptoms had subsided and the leukocyte count had fallen to 30,000, and the patient went on to uneventful convalescence. In connection with this case it is of interest to point out the experience of White and Prevost.[21] A cholecystogastrostomy was done on their patient two months after the onset of spirochetal jaundice and the gallbladder was found to contain hemorrhagic material which on dark field examination was positive for leptospiras. Another case reported by Gaines and Johnson[22] on operation showed an intramural obstruction

21. White, J. J., and Prevost, J. V.: Weil's Disease: Report of Three Cases Including Marked Anatomy of One Case and Brief Review of Pertinent Literature, Ann. Int. Med. **15**: 207 (Aug.) 1941.

22. Gaines, A. R., and Johnson, R. P.: Weil's Disease; Report of Seven Cases, Arch. Int. Med. **60**: 817 (Nov.) 1937.

of the ductus choledochus consequent to inflammation of the duodenal wall and the ampulla of Vater. Appreciation of the various aspects of the gastrointestinal manifestations of this disease are of great importance in the differential diagnosis during the acute stage.

CARDIAC AND ELECTROCARDIOGRAPHIC FEATURES

Symptoms and findings referable to the heart are not uncommon in our experience. The German literature cites numerous instances of pathologic changes in the heart consisting of myocardial necroses, fibrous pericarditis, infarction and vegetative endocarditis. Descriptions of similar complications have not appeared in the American literature to our knowledge. In our 1 case that came to autopsy (case 4) scattered petechial hemorrhages were observed in the endocardium. Microscopic examination showed fibrinous exudate on the epicardium with collections of lymphocytes in the underlying connective tissue. The myocardium showed scattered areas of fragmentation, and there were areas containing free red blood cells in the stroma.

We have observed the following clinical conditions during the acute stages of the disease: gallop rhythm, pericardial friction rub, enlargement of the heart, severe sinus tachycardia and premature beats. Most of these findings disappeared during convalescence. Electrocardiograms were taken on 5 of our patients and among the significant findings noted were prolongation of the QT interval, defective auriculoventricular conduction, low T waves, blocked auricular beats and prolonged PR intervals. Electrocardiograms taken during convalescence showed a gradual return to normal.

Fig. 2.—Section of heart of O. D. Note tranverse fragmentation of myocardial fibrils. Interstitial edema and hemorrhage are also present.

A brief report of our fatal case referred to is given here. The pathologic changes in this case have been described in detail by Harris.[14]

O. D., a white man aged 39, a dairy hand, noted the sudden onset of his illness on Sept. 14, 1941 associated with severe pains in the muscles of his forearms, legs and back. Later in the day a shaking chill was experienced, and his temperature was found to be 101 F. Shortly thereafter he began to vomit greenish material, and by evening he had begun to experience a dry hacking cough. This course continued for five days, during which time much smaller amounts of urine than normally were passed, and the patient became progressively more exhausted with chills and high fever. He was admitted on the fifth day of his illness when a definite icterus was observed. Physical examination was otherwise negative save for a tender enlarged palpable liver. The white blood cell count was 15,000 with 97 per cent polymorphonuclear leukocytes; the urine showed 3 plus albumin, numerous red blood cells, many granular casts and 4 plus bile. Blood urea nitrogen was 16.1, dextrose 143 and the icterus index 110. A chest film revealed no abnormalities. While in the hospital, the patient became steadily more toxic, his temperature went higher and he voided very little urine. On the eighth day a pericardial friction rub was heard. Death occurred on the ninth day of his illness, when his temperature was 103 F. No urine was passed in spite of heroic measures to produce diuresis.

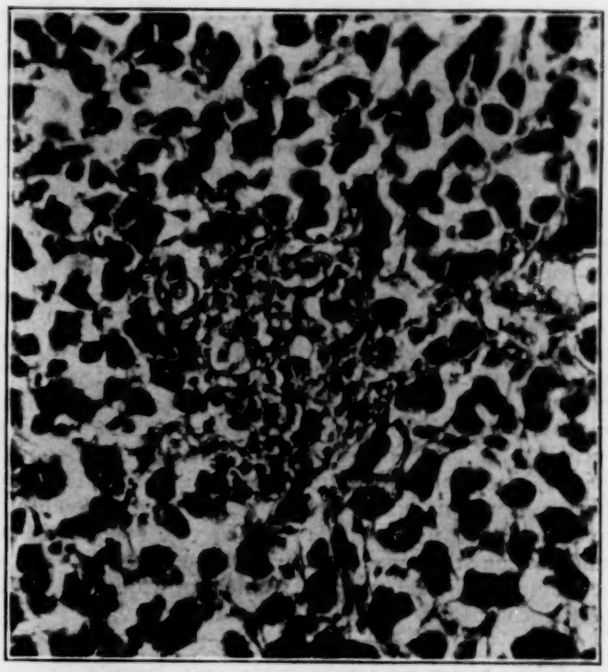

Fig. 3.—Section of liver of O. D. Note central area of necrosis.

Autopsy revealed, among the essential findings, jaundice, petechial areas over the chest and ecchymotic areas over the parietal peritoneum. The liver was enlarged. Microscopic sections of the liver showed considerable disorganization of the arrangement of the liver cells, which occurred in groups of 2 or 3 cells rather than in continuous cords. These groups were interspersed with clumps of lymphocytes. The kidney sections showed a diffuse infiltration of lymphocytes between the glomeruli. The latter were small and showed large capsular spaces. Many endothelial lined spaces filled with blood were observed in the medulla and to a lesser extent in the cortex. Levaditi stains of the kidney showed many leptospiras. When the pericardial cavity was opened some fibrinous exudate was noted on the epicardium in the region of the right auricle. Microscopic examination showed fibrinous material with collections of lymphocytes in the underlying connective tissue. The myocardium showed areas of fragmentation. Free red blood cells were evident in areas of the stroma. Blood taken from the patient post mortem agglutinated Leptospira icterohemorrhagiae in a titer of 1 : 500.

COMMENT

We are inclined to agree with Ashe and his group that a clinical diagnosis of spirochetal jaundice is feasible, but we would like to add the qualification "with assurance only in typical cases." We feel that many cases are typical and will be missed unless the condition is considered and the proper laboratory studies are car-

ried out. We wish to suggest that in any acute infectious condition in which agglutinations for other diseases are negative tests for leptospirosis be made.

As Walch-Sorgdrager has pointed out, the clinical symptoms of diagnostic significance are:

1. An acute infectious disease with acute onset, fever, headache and prostration. 2. Severe myalgia appearing spontaneously and on pressure in the thigh, calves and back. 3. Signs of liver damage. 4. Signs of kidney damage. 5. Leukocytosis. 6. Epidemiologic information—immersion, occupation. We feel that if any four of these features are present the diagnosis of spirochetal jaundice should be strongly entertained.

SUMMARY AND CONCLUSIONS

There are some factors which might explain the increasing incidence of reported cases of human leptospirosis in North America. It has been pointed out that spirochetal jaundice has been present in Louisiana since at least 1905. Salient features of 15 cases have been observed at Charity Hospital over a period of two and one-half years. Interesting aspects are encountered in the differential diagnosis of these cases. There is a high incidence of gastrointestinal symptoms and abdominal crises. The similarity of spirochetal jaundice in its early phases to pneumonia makes it possible for the condition to be mistaken for hepatitis secondary to pneumonia or sulfonamide therapy. Symptoms and clinical signs referable to the heart and the electrocardiogram have been encountered.

OCCIPITOPOSTERIOR POSITION

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NEW YORK

The occipitoposterior position is perhaps the most common and important abnormality in the mechanism of vertex presentations, occurring in approximately 25 per cent of all such presentations. Its management has long been a matter of discussion. Although the literature on the subject is voluminous and facts of some value have been derived from it, there will undoubtedly be many more contributions, for there will always be a posterior.

The occipitoposterior position is probably much more common than is generally supposed. I am convinced that many prolonged labors supposedly occipitoanterior were occipitoposterior in the beginning. The reported incidence varies greatly: Tweedy and Wrench [1] reported 121 cases in 15,167 deliveries (0.8 per cent); Williams,[2] 11.3 per cent in 5,000 cases; Scott,[3] 14.04 per cent in 1,000 consecutive cases; Piper,[4] 17.1 per cent; Danforth,[5] 25.1 per cent in 1,131 private deliveries. In an earlier paper [6] I reported 500 cases of occipitoposterior position in 3,966 deliveries, an incidence of 12.6 per cent. D'Esopo [7] noted that 19 per cent of all vertex presentations engaged in the posterior position. In our series of 5,105 deliveries in St. Ann's Maternity Hospital, including both private and general services, there were 600 cases of occipitoposterior position (11.76 per cent). Detailed statistics of these cases will be found later in this paper.

In vertex presentations the occiput, as a rule, lies at a lower level in the pelvis than the sinciput and consequently rotates forward even in cases in which

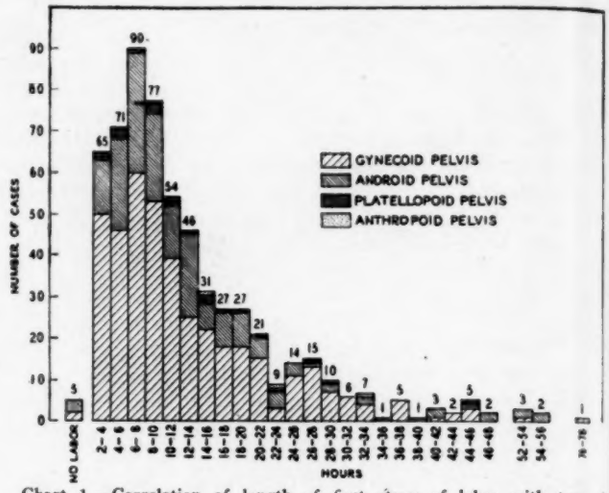

Chart 1.—Correlation of length of first stage of labor with type of pelvis in cases of occiptoposterior position in two hour intervals.

it was posterior in the beginning. In a small proportion of cases the back is posterior at first and flexion is not complete; consequently the sinciput is as low as, or even a little lower than, the occiput. As a result the sinciput tends to rotate forward, the face lying behind the pubes, and the occiput is carried into the hollow of the sacrum.

Incomplete flexion of the head, and hence posterior rotation of the occiput, is more common when the occiput is primarily directed backward. Herman [8] explains this tendency as follows: Extension of the head in occipitoposterior presentations comes about in two

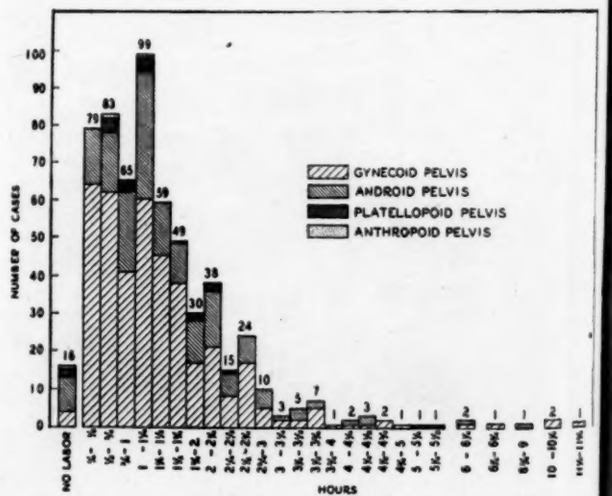

Chart 2.—Correlation of length of second stage of labor with type of pelvis in cases of occipitoposterior position in fifteen minute intervals.

ways: (*a*) because the axis of the uterus and of the pelvic brim is concave behind; (*b*) because the greatest diameter of the head is behind the center. The child must accommodate its attitude to the space in which it lies. When the axis of the upper part of the uteropelvic canal is concave behind, then, if the child's back

From St. Ann's Maternity Hospital.

1. Tweedy, E. H., and Wrench, G. T.: Practical Obstetrics, ed. 7, revised by Bethel Solomons and N. M. Falkiner, London, Milford, 1937, p. 336.
2. Williams, J. W.: Obstetrics, ed. 6, New York, D. Appleton & Company, 1930, p. 322.
3. Scott, R. A.: Am. J. Obst. & Gynec. **23**: 400 (March) 1932.
4. Piper, E. B., in Curtis, A. H.: Obstetrics and Gynecology, Philadelphia, W. B. Saunders Company, 1933, vol. 2, p. 86.
5. Danforth, W. C.: Am. J. Obst. & Gynec. **23**: 360 (March) 1932.
6. Hennessy, J. P.: Virginia M. Monthly **63**: 663 (Feb.) 1937.
7. D'Esopo, D. A.: Am. J. Obst. & Gynec. **42**: 937 (Dec.) 1941.
8. Herman, G. E.: Difficult Labour, ed. 7, London, Cassell & Co. Ltd., 1929, p. 7.

lies in front, the spine will be bent and the abdominal surface, which is behind, may be concave. If the position of the child is such that the abdomen lies in front, then accommodation to the cavity can be obtained only by some extension of the spine. If this extension is enough to bring the occipitospinal joint in front of the line along which the propelling force acts, this force will, unless opposed, produce full extension of the head. When the head enters the brim with the occiput anterior, the biparietal diameter corresponds almost exactly with one or the other oblique diameter of the pelvis when there is room for it. If, however, the occiput is posterior the biparietal diameter must fit into a diameter of the pelvis which is posterior to, and smaller than, the oblique diameter. As a result the occiput is retarded, producing a varying degree of extension.

As to the cause of primary occipitoposterior position opinions differ, but many authors [9] agree as to the deviations from normal of the bony pelvis. Thoms [10] mentions the relative or the actual diminution of the transverse diameter of the inlet, and Caldwell and Moloy [11] state that this type of deformity, as exhibited in their "android" pelves, necessarily tends to cause posterior engagement. Our experience has shown that the narrower the anterior pelvis the higher the percentage of posterior positions. Many authors recognize definite pelvic contraction as a cause of posterior posi-

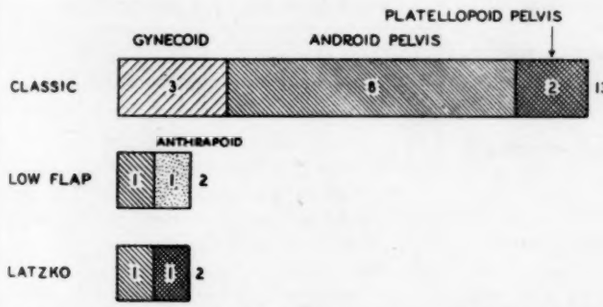

Chart 3.—Correlation of delivery by cesarean section with type of pelvis. This operation was performed in 17 (2.8 per cent) of the 600 cases of occipitoposterior position.

tion. The etiologic importance of deflection of the head is often mentioned, but deflection in turn depends on such pelvic asymmetry as disturbs the equality of pressure on the ends of the occipitosincipital lever (Cosgrove). Other important causative factors to consider are the posture of the fetus in utero and weak labor pains (poor muscle tone). The latter also applies to the abdominal muscles, particularly in lax or pendulous abdomens. The association of weak labor pains with a deficient pelvic floor is found in a large percentage of multiparas. Here the elements which normally bring about flexion and internal rotation are absent, and the occiput is likely to remain posterior.

The occipitoposterior position is not in itself a pathologic condition, but it may become so because of persistence caused by the factors mentioned. Posterior positions are likely to be a cause of difficult labor, owing to the fact that the head is usually extended when difficulty is encountered. Naturally, therefore, if there is any pelvic disproportion the labor is increasingly prolonged. Whether or not subsequently the position is corrected by anterior rotation, labor is more tedious than with anterior positions. On an average it lasts from two to four hours longer in primiparas and from one to two hours longer in multiparas. I believe that this delay occurs during the stage of expulsion and that in the majority of cases rotation occurs spontaneously if labor is allowed to continue long enough,

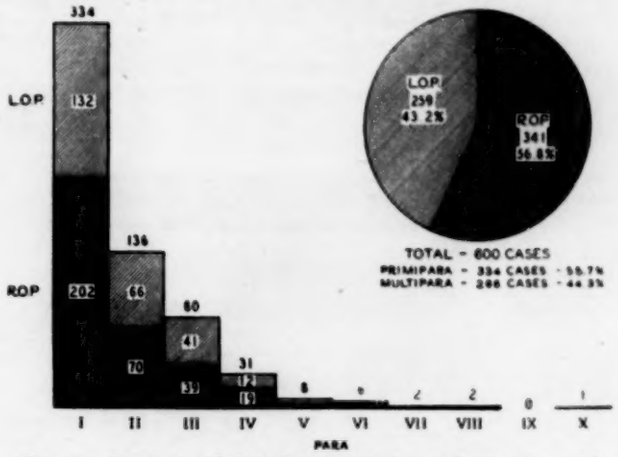

Chart 4.—Correlation of the left and the right occipitoposterior position (*L. O. P.* and *R. O. P.*) with number of births.

but we have tried to spare our patients and shorten the second stage of labor by correcting this abnormality. How this should be done depends on the individual operator. Every obstetrician who has had a large experience with this position is apt to have rather definite ideas as to its treatment, and probably the procedure in which he is most adept is the best for his use.

In determining whether intervention may be necessary, careful palpation of the ischial spines is most important. If they are unduly prominent there will be more midplane contraction and the chances of long rotation are considerably decreased, a warning that manual rotation, use of forceps or version may be required. X-ray findings may be misleading, for the x-rays do not always show clearly the size, height and thickness of the ischial spines and the narrowing of the midplane. If the bispinous diameter is narrow, posterior position may be anticipated early in labor and operative intervention may be instituted under the most favorable circumstances. Delay in anterior rotation of the head as it descends in the pelvic cavity is definitely the result of cephalopelvic disproportion or of that pelvic asymmetry which materially diminishes the space in the fore pelvis. With the relatively greater amount of space in the posterior pelvis, the law of accommodation necessitates a posterior position of the occiput; that is, descent in the line of least resistance.

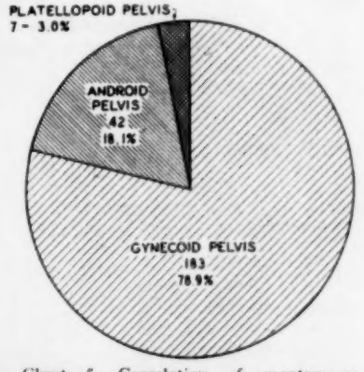

Chart 5.—Correlation of spontaneous anterior rotation with type of pelvis in the 232 cases of occipitoposterior position in which it occurred.

In cases with no satisfactory progress it is our rule to recheck, owing to the probability of a posterior position.

9. Vaux, N. W.: Am. J. Obst. & Gynec. **20**: 782 (Dec.) 1930. Hanson, Samuel: Surg., Gynec. & Obst. **59**: 102 (July) 1934. Cosgrove, S. A.: Am. J. Obst. & Gynec. **31**: 402 (March) 1936.
10. Thoms, Herbert: Surg., Gynec. & Obst. **56**: 97 (Jan.) 1933.
11. Caldwell, W. E., and Moloy, H. C.: Am. J. Obst. & Gynec. **26**: 479 (Oct.) 1933.

The management of these cases calls for careful antepartum examination. This should not be limited to measurement of the pelvis and periodic examination of the urine; it must include a general examination of the patient early in her pregnancy, careful antepartum supervision and a thorough knowledge of the pathology of pregnancy. The estimation of the pelvis should take

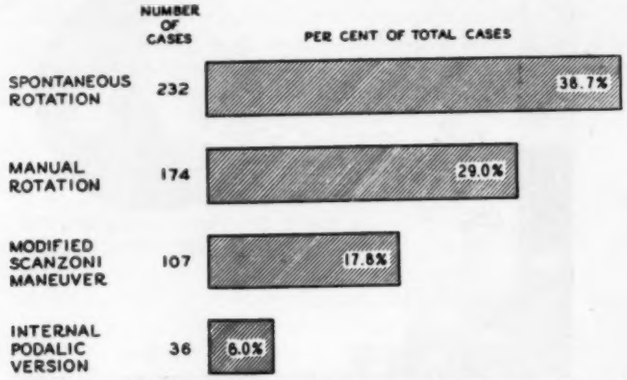

Chart 6.—Methods of rotation used in cases of persistent occipitoposterior position.

into account the diameter of the inlet, of the midpelvis and spines of the ischium and of the outlet, for deviation from the normal in any of these planes may lead to difficulty. In doubtful cases the x-rays should be utilized in order to make the diagnosis clear. Every pelvis should be checked and rechecked before the onset of labor. If careful examination shows a normal pelvis and a normal size baby, the posterior position need not cause too much uneasiness, since in such cases spontaneous rotation usually occurs. If the pelvis is abnormal the prospect of a normal delivery is doubtful, and the presence of a posterior position must be recognized as a factor of real dystocia. Labor will be prolonged, causing some exhaustion of the mother, with danger to the fetus, and there is a great risk of extensive perineal laceration. In a primipara labor which begins by rupture of the membranes without previous pain suggests a posterior position.

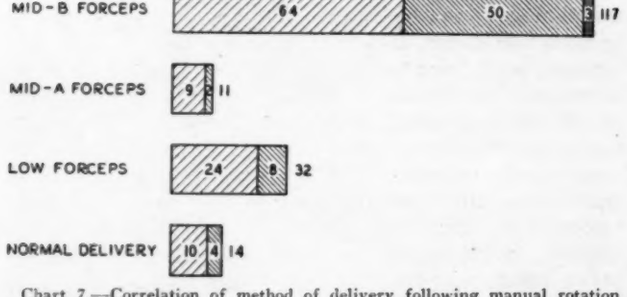

Chart 7.—Correlation of method of delivery following manual rotation with type of pelvis. Manual rotation was done in 174 of the 600 cases of occiptoposterior position.

DIAGNOSIS

Diagnosis is aided by palpation of the fetal extremities: anterior and to the left when the occiput is in the right posterior position, and the reverse when the occiput is in the left posterior position. The fetal heart is not always heard on the side of the given position; it may be heard on the opposite side, because the fetal thorax, being anterior, transmits the sound into the latter position. This, no doubt, is brought about by the partial extension of the head. If on vaginal examination both the large and small fontanels are felt, it indicates imperfect flexion. The small fontanel is in the right or the left posterior quadrant, and the large fontanel is easily felt in the opposite anterior quadrant. When an extensive caput succedaneum obliterates the fontanels, palpation of the posterior ear reveals the location of the occiput. The right position occurs much more frequently than the left. In vertex presentations a fairly large percentage enter the pelvis with the sagittal suture lying transversely, particularly in cases with a forward sacral promontory; therefore, in the beginning they are occiput transverse.

TREATMENT

There are no set rules to cover all cases. In my opinion it is much better for labor to be definitely established and sedation not given until dilatation of the cervix reaches 3 to 3.5 cm. If sedation is given too early, it tends to slow and prolong labor and additional sedation is required, leading in some cases to increased morbidity and birth injuries. While the cervix is dilating, a Beck binder is applied. The bag of waters is preserved as long as possible, both for its dilating factor and to facilitate version if this is indicated. If dilatation is unduly slow, the anterior end of the fetal head may be forced upward, thereby increasing flexion. No inter-

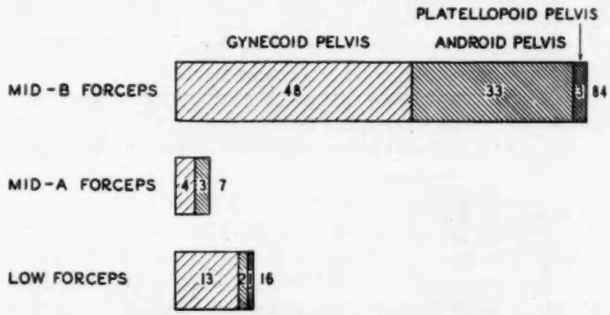

Chart 8.—Correlation of method of delivery following the modified Scanzoni maneuver with type of pelvis. This maneuver was used in 107 of the 600 cases of occipitoposterior position.

vention is made until the cervix is completely dilated and effaced; then, if the head remains unengaged (whenever the longest diameter of the head has not passed through the pelvic inlet), podalic version is performed. This is more easily done before the membranes have ruptured; therefore, when all conditions have been fulfilled, it is better to deliver early. If the membranes have already ruptured and the head is still high when the os is fully dilated, version should be done as promptly as possible before the amniotic fluid has drained away and while there is still a sufficient amount of liquor remaining in the sac. When an engaged head is at the spines, from one and a half to two hours of labor is allowed for rotation; if it is below the spines, about an hour is allowed. Occasionally this rule is broken to permit better molding in the case of a fairly large head, provided mother and child are in good condition. Manual rotation properly performed is simple and causes less trauma than other methods. I have used Schumann's [12] modification of the Pomeroy technic as follows: The hand whose palmar surface will slip over the occiput is introduced into the vagina; the first and second fingers slip past the head and seek the anterior axilla, the head lying loosely in the palm of the hand. With the other hand making abdominal pressure, the shoulder of the child

12. Schumann, E. A.: M. Rec. **143**: 285 (April 1) 1936.

is firmly pushed around the anterior aspect of the pelvis until the body has been rotated almost 180 degrees. The occiput becomes dislodged from under the promontory of the sacrum and turns with the body into an anterior position. When this is accomplished, the hand is not withdrawn until after one blade of the forceps has been applied to the head, acting as a wedge to prevent the occiput from rotating again to the posterior position. The second blade is then applied, and delivery follows.

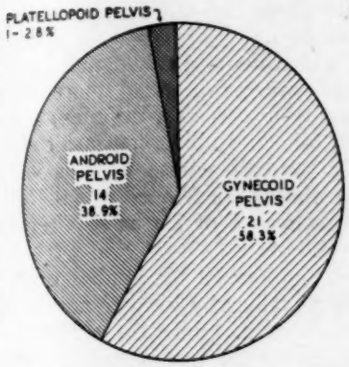

Chart 9.—Correlation of delivery by internal podalic version and breech extraction with type of pelvis. This operation was necessary in 36 of the 600 cases of occipitoposterior position.

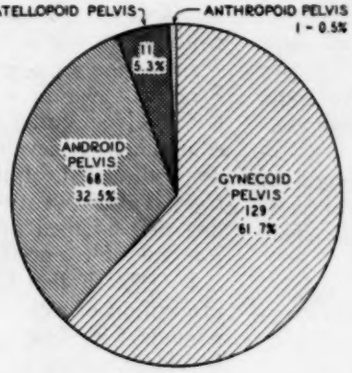

Chart 10.—Correlation of premature rupture of membranes with type of pelvis. Premature rupture occurred in 209 (34.8 per cent) of the 600 cases of occipitoposterior position.

In forceps rotation I prefer the modified Scanzoni method as described and advocated by Bill.[13] I try to rotate the head in the station in which it lies, just as would be done with the hand, although with the forceps there is apparently less displacement of the head. If this is properly done there should be no laceration or injury of the child. This procedure has been followed in several hundred cases and in only 2 instances (both the babies were large with large heads) was it impossible to rotate the head by forceps. Only 9 cases in our series were delivered by Kielland's forceps since we have not found this instrument successful when used as described by Kielland. On one or two occasions Kielland's forceps has been applied after the head had been rotated manually to the anterior position.

CESAREAN SECTION

Cesarean section was resorted to in 17 cases in our series, but in no case did the posterior position furnish the sole indication for this procedure. Early recognition of the positive indications for cesarean section and prompt operation would probably spare the mother much risk and additional pain and save the life of the baby in many instances. This is especially true with regard to the borderline pelvis with nonengaging head.

In the 600 cases of occipitoposterior position which I have reported from St. Ann's Maternity Hospital the position was right occipitoposterior in 341 (56.9 per cent) and left occipitoposterior in 259 (43.2 per cent). There were 334 primiparas and 266 multiparas.

Anterior rotation occurred spontaneously in 232 cases (35.9 per cent). In 100 of these cases the spontaneous rotation was followed by a normal delivery. This leaves 500 cases in which some form of operative intervention was required. The method of rotation in this group was as follows: manual rotation, 174 cases (29 per cent); modified Scanzoni maneuver, 107 cases (17.8 per cent); version, 36 cases (0.6 per cent).

13. Bill, A. H.: Am. J. Obst. & Gynec. **22**: 615 (Oct.) 1931.

Following manual rotation, forceps were used as follows: low forceps, 32; mid-A forceps, 11; mid-B forceps, 117; total, 160.

Following the modified Scanzoni maneuver, forceps were used as follows: low forceps, 16; mid-A forceps, 7; mid-B forceps, 84; total, 107.

Midforceps were used in 219 cases (27.3 per cent).

Internal podalic version for high or unengaged heads was performed in 36 cases (0.6 per cent). In 209 cases (34.8 per cent) the membranes ruptured before the onset of labor.

In the entire series of 600 babies 3 were stillborn and 3 died during the first fourteen days, a gross fetal and neonatal mortality of 1 per cent. The 3 stillborn ones were all in the mid-B forceps class. The first was a large baby with a fairly large head in an android pelvis; rotation could not be done, and intracranial injury resulted from occipitoposterior delivery. The second was delivered after prolonged labor (forty-two and one-half hours) and a modified Scanzoni maneuver. The third was also delivered by a modified Scanzoni maneuver, and there were two coils of cord around the child's neck and one under the axilla.

One of the 3 babies who died in the fourteen days after delivery lived only ten minutes (prolonged labor, cerebral injury); the second died after three hours, of a congenital anomaly of the heart, and the third died of gastroenteritis on the fourteenth day.

There were no maternal deaths, and the morbidity accompanying the complication was as follows: infection of perineum, 1 case; mastitis, 2 cases; pyelitis, 8 cases; sapremia, 15 cases; total, 26 cases (4.3 per cent).

SUMMARY

1. Early recognition of the occipitoposterior position is most important, as this complication always complicates labor, sometimes to a serious degree.

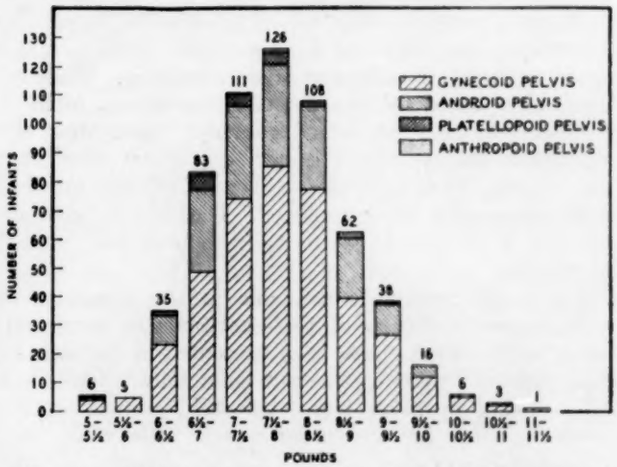

Chart 11.—Correlation of weight of infant at birth with type of pelvis in cases of occipitoposterior position.

2. The first stage of labor is sometimes much prolonged and should be so managed as to minimize the suffering and exhaustion of the mother. The second stage may often be shortened with great advantage to the mother and the child.

3. The female pelvis is subject to many variations in size and shape; therefore each labor is different, and operative procedures must be individualized.

4. In the narrow fore pelvis the true conjugate is of average length; also with a forward promontory of the sacrum there are more occiput transverse presentations.

5. In a series of 600 consecutive cases of occipitoposterior position at St. Ann's Maternity Hospital, New York, the gross fetal and neonatal mortality was 1 per cent. The fetal mortality, therefore, was no greater than in occipitoanterior positions.

6. Parity and age apparently are not factors in this complication.

7. Large size of the baby per se is not the cause of posterior positions; it is a factor only when associated with pelvic deviations from the normal.

8. The occipitoposterior position need no longer be dreaded, as nearly all cases can be dealt with successfully even if anterior rotation should fail to occur spontaneously.

116 East Sixty-Eighth Street.

PREVENTION OF EXPERIMENTAL RABIES

TREATMENT OF WOUNDS CONTAMINATED BY RABIES VIRUS WITH FUMING NITRIC ACID, SOAP SOLUTION, SULFANILAMIDE OR TINCTURE OF IODINE

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AND
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Prevention of rabies by local treatment of bites inflicted by rabid animals has occupied the attention of practitioners of the healing art from at least as early as the first century A. D. Celsus [1] at that time and Galen [2] in the next century advised cauterization with a hot iron. The latter also suggested that the wound be incised and drawing medicine applied in order to maintain a running ulcer for at least forty days.

Between that time and the eighteenth century, many other methods of treatment were employed. Many of these were based on mysticism or empiricism, often in conjunction with the actual cautery. Soon after the eighteenth century began, cauterizing agents other than the hot iron came into use. Silver nitrate and burning with gunpowder were employed. The first to advocate the use of nitric acid seems to have been Dr. Samuel Danforth.[3]

Little information is available in the literature in regard to the efficacy of these methods of treatment. Most of the results have been presented in the form of case reports. Since physicians now know that about 65 per cent of those bitten by rabid animals escape infection,[4] this kind of proof means little when only 1 or 2 cases are cited.

Scant proof has been offered to show the value of the various types of local treatment that have been applied to wounds contaminated with rabies virus experimentally. Babes [5] studied the value of the thermocautery in dogs and rabbits. He inflicted wounds on the faces of 10 dogs and 15 rabbits and then contaminated the wounds with fixed rabies virus. The wounds of 8 dogs and 13 rabbits were deeply cauterized at different intervals, and the remaining 2 dogs and 2 rabbits served as controls. Three of the 8 treated dogs and 4 of the 13 treated rabbits did not develop rabies, while all of the controls died.

In the experiment in which he used rabbits, all of the 7 animals whose wounds were cauterized more than twenty-five minutes (twenty-five to sixty minutes) after contamination developed rabies. In his experiment with dogs all but 1 of the 5 animals whose wounds were treated after twenty-five minutes developed rabies. The dog that escaped infection was 1 of 2 treated after an interval of twenty-four hours.

In 1899 Follen Cabot [6] published his studies on the prevention of experimental rabies by local treatment of wounds with fuming nitric acid. Since his publication is widely quoted as a basis for the use of fuming nitric acid for the treatment of wounds inflicted by rabid animals on human beings, the technic that he followed is stated in full:

> A portion of medulla taken from a rabbit dead from laboratory rabies was beaten into an emulsion composed of 1 part of medulla to 5 parts of sterile water. Of this emulsion 1 cc. was injected with a hypodermic needle into the outer and upper part of the thigh of a guinea pig. The hair was closely cut, and the point of the needle introduced one fourth of an inch, at right angles, into the region of the sciatic nerve. This injected virus was left undisturbed for twenty-four hours, at the end of which time an incision half an inch long was made over the seat of puncture, exposing the nerve. The tissue in the wound surrounding the point of puncture was carefully swabbed out and the cautery applied, the animal meantime being anesthetized with chloroform.

For each of his experiments Cabot divided his animals into four groups. Group 1 was treated with fuming nitric acid, group 2 with the thermocautery and group 3 with silver nitrate. In group 4 the wounds were swabbed out with dry absorbent cotton and left open. Each group had its own set of control animals. Of the guinea pigs that were treated with fuming nitric acid 91 per cent did not develop rabies, against 15 per cent of the controls. The results with the actual cautery were equally striking, as 70 per cent of the treated animals and only 11 per cent of the controls escaped the infection. In the experiments with silver nitrate 55 per cent of the treated animals did not become infected, compared with 16 per cent of the control animals. Thirty-one per cent of the guinea pigs whose wounds were only swabbed out with cotton and 16 per cent of their controls did not develop rabies.

Poor [7] reported the results of a single experiment in which he used fuming nitric acid to treat wounds that had been contaminated with rabies virus. He made an incision on the back of the neck of each guinea pig and cut the subcutaneous tissues on either side of the wound in several places with scissors. The wounds were

From the Illinois Department of Public Health, Division of Laboratories.

1. Underwood, J. W.: The Eight Books on Medicine of Aurelius Cornelius Celsus, 1830, vol. 3, p. 107.
2. Hamilton, Robert: Remarks on the Means of Obviating the Fatal Effects of the Bite of a Mad Dog or Other Rabid Animals, London, Shaw and Jackson Company, 1780, p. 30.
3. Thatcher, James: Observations on Hydrophobia, Joseph Avery Company, 1812, p. 239.
4. Cornwall, J. W.: Statistics of Antirabic Inoculations in India, Brit. M. J. **2**: 298, 1923.
5. Babes, V.: Etudes sur la rage, Ann. Inst. Pasteur **8**: 434-448, 1894.
6. Cabot, Follen: The Cauterization of Wounds Infected with the Virus of Rabies After an Interval of Twenty-Four Hours, Medical News **74**: 329-331, 1899.
7. Poor, I. W.: The Late Cauterization by Means of Nitric Acid of Wounds Infected with Rabies Virus, Collected Studies from the Research Laboratory, No. 6, Department of Health, New York, 1911, p. 25.

contaminated with street virus and then their edges were brought together with adhesive plaster. Twenty-two hours later they were opened and fuming nitric acid was applied. Twenty guinea pigs were used in this experiment, and of this number 12 were treated and 8 served as controls. Five of the treated animals did not develop rabies, whereas all the controls succumbed.

It is difficult to evaluate the results of these experiments. With the exception of Cabot's [6] experiments the studies were conducted with comparatively small numbers of animals. The experimental procedures used by these investigators were varied and in some instances were quite unlike the natural mode of infection and application of therapy. Cabot's methods especially may be criticized in the latter regard. The application of cauterizing agents to the region of the exposed sciatic nerve might have damaged the nerve sufficiently to prevent progression of the virus along its fibers. Possibly this explains, at least in part, why Cabot obtained such good results. Obviously, however, such a method of treatment, which may involve the destruction of main nerve trunks, could not be employed in the prevention of human rabies.

Rosenau [8] wrote in his textbook:

> Experiments under my supervision (unpublished) indicate that practically all guinea pigs may be saved by prompt application of nitric acid; that its effectiveness decreases with time, but that it is still partially protective up to forty-eight hours. No other substance gives equally good results. Strong germicides, such as carbolic acid, are not reliable; nitrate of silver is valueless; formalin and the actual cautery are not effective. Nitric acid, on account of its diffusibility and penetration, is almost specific for rabies. . . .

The experiments referred to by Rosenau have not been published; consequently it is not possible to analyze his results. It would be of interest, however, to know how many substances other than those he mentioned were tried by him and how he determined the diffusibility and penetration of nitric acid applied to wounds of this character. It should be pointed out that Rosenau's and Cabot's observations conflict in respect to the use of silver nitrate and the actual cautery but that they are in complete agreement in regard to the effects of fuming nitric acid.

The clinical and the experimental evidence cited in the preceding paragraphs do not, in our opinion, establish the value of fuming nitric acid in the prevention of rabies. Yet it appears that on the basis of these reports most public health and medical authorities at the present time recommend that bites inflicted by rabid animals be treated with fuming nitric acid. Cauterization with fuming nitric acid produces many undesirable reactions. Its application to wounds is painful, and bacterial infections may result because of its destructive action on tissues. Usually healing is slow after its use, and severe scarring may follow. If the acid is applied to deep wounds, contractures may result or periosteal and bony tissues may be damaged. Consequently, physicians are reluctant to apply fuming nitric acid to bites of rabid animals, especially when the bites are deep and badly lacerated or when they are inflicted on the face. Gowen's [9] survey of the actual practice in Illinois bears this out. He showed that fuming nitric acid was used to treat only about 28 per cent of the cases in which wounds inflicted by presumably rabid animals were given any form of local treatment.

In view of these facts we decided to investigate more thoroughly the effect of fuming nitric acid in the prevention of rabies by applying it to wounds that were contaminated experimentally with rabies virus. In addition we compared the value of soap solution and tincture of iodine with that of fuming nitric acid. We also studied the effect of packing the wounds with sulfanilamide after they had been treated with soap solution.

METHODS AND MATERIALS

Virus.—In these studies it was desired to infect either guinea pigs or mice with rabies virus in such a manner as to simulate as closely as possible the mode of the infection resulting from a bite of a rabid animal. Since natural rabies is caused by an infection with rabies street virus and since most of the animal bites are deep enough to reach subcutaneous and muscle tissues, attempts were made to obtain a strain of street virus that would be infectious for these animals on inoculation into these tissues. Twenty-eight strains of street viruses were isolated from brains of dogs that had died of the natural disease. The isolations were made by preparing a 10 per cent suspension of the brain of each dog and by injecting 0.5 and 0.15 cc. intramuscularly and 0.15 and 0.03 cc. intracerebrally into guinea pigs and mice respectively. Usually 2 guinea pigs and 4 mice were given an injection by each route and with each specimen. The intramuscular inoculation was made into the gastrocnemius muscle.

Only 5 of these 28 strains produced rabies by intramuscular inoculation. Each of these 5 strains infected about 50 per cent of the guinea pigs and mice in the first passage. By the intracerebral route of injection, all of the strains were infectious for both guinea pigs and mice, producing about 96 per cent mortality. A diagnosis of rabies was made in the test animals by detecting Negri bodies in smear preparations of the brains of those that died.

Only those viruses that were infectious by intramuscular injection were employed in the experiments. Each virus was passed once either in guinea pigs or in mice by the intramuscular route before it was used to infect the experimental animals. In attempts to infect a larger number of animals under the experimental conditions it was found that these strains did not produce rabies consistently. The rates of infectivity varied from 5 to 50 per cent in the control mice and from 1 to 80 per cent in the control guinea pigs. Their virulence could not be enhanced or maintained by serial intramuscular passages either in guinea pigs or in mice. Four strains lost their infectivity by the intramuscular route after two passages and one after four. Consequently these studies could not be successfully conducted with any of these strains of viruses. They were employed in a few of the preliminary studies, but a fixed rabies virus was used in the main experiments.

After testing the virulence of several strains of fixed rabies viruses it was found that one strain, S-1, consistently infected guinea pigs and mice by the intramuscular route of inoculation. S-1 virus was fixed for rabbits, and it was maintained in them by serial intracerebral passages. Before it was used to inoculate the animals in the experiments it was passed once through guinea pigs by intramuscular injection except in experiments 16, 17 and 18, in which rabbit brain virus was employed. Its virulence after the first passage in guinea pigs was such that 0.5 and 0.1 cc. of a 1 per cent suspension of an infected guinea pig brain produced rabies in 100 per cent of the guinea pigs and mice respectively. The virus was inoculated in the muscle tissues of the left hindleg, and the animals died within ten days after the injection. The minimum lethal dose of S-1 virus for mice by the intracerebral method of inoculation was about 0.03 cc. of a 10^{-6} dilution.

In the experiments each guinea pig was given an injection of 0.2 cc. of either a 10 or a 20 per cent suspension of the

8. Rosenau, M. J.: Preventive Medicine and Hygiene, ed. 6, New York, D. Appleton-Century Company, 1935, p. 353.
9. Gowen, G. H.: Rabies in Illinois 1936, Illinois M. J. **72**: 174-177 (Aug.) 1937.

virus. The virus suspensions were prepared from approximately equal portions of the brains of at least 2 guinea pigs which had died after intramuscular injection of S-1 virus. Only brains that were free from bacterial contamination and had not been stored longer than five days at about — 5 C. were used. The suspensions of virus were made in hormone broth.

Inclusion bodies were found in the brains of guinea pigs and mice that died from infection with S-1 virus. Some of these bodies were spherical and others oval. They were about the size of Negri bodies with the exception that about 25 per cent of the spherical type were much smaller. When the bodies were stained by Seller's method their peripheries were dark blue, the bodies themselves were pink, and the typical dark blue granules seen in Negri bodies were absent. The presence of these inclusion bodies was not considered diagnostic for rabies.

Animals.—Guinea pigs weighing from 300 to 450 Gm. were employed in the main experiments. Albino Swiss mice, each weighing about 20 Gm., were used in the preliminary studies and in the virus neutralization tests. The sexes were about equally represented in both the guinea pigs and the mice. The animals were kept in individual cages to prevent fighting, cannibalism and cross infection. In the experiments the animals were kept under observation for thirty-five days after inoculation. Thereafter the surviving animals were released and about 90 per cent of the female and about 15 per cent of the male guinea pigs were used for breeding purposes. Under such an arrangement more than 65 per cent of the released guinea pigs were observed for about one year. The longest incubation period that was noted in the guinea pigs inoculated with S-1 rabies virus was fifteen days, the average being about seven days.

Methods of Inflicting the Wounds and Inoculating Them with Rabies Virus.—The procedures of inoculation were designed to approximate as closely as possible the mode of the infection caused by a bite of a rabid animal. Three such methods were employed. The site selected for the wound in each case was the muscular tissue on the back of the neck, slightly anterior to the shoulder blades. The hair was always clipped from the site of inoculation, and aseptic technic was observed in all of the methods.

Method 1. A rat tooth forceps was dipped into a 20 per cent virus suspension and then clamped on the neck muscles of the animal. By this procedure the wound was contaminated at the same time that it was inflicted. The amount of the virus suspension transferred by the forceps in a single dip could not be accurately determined. It was estimated, however, that about 0.05 cc. of the suspension was planted in the wound. The wound inflicted in this manner contained three punctures, and in the course of treatment it was necessary to treat each puncture separately. For inoculation of guinea pigs this procedure was unsatisfactory because the skin of these animals, owing to its thickness, could be punctured by the teeth of the forceps only with difficulty. Although method 1 probably simulates most closely the natural mode of infection, it could not be used in experiments with guinea pigs.

Method 2. This is a modification of the technic employed by Cabot [6] and Poor.[7] Only guinea pigs were inoculated by this method. Each animal received 0.2 cc. of a virus suspension in the muscle tissues in the back of the neck, slightly anterior to the shoulder blades. A 22 gage hypodermic needle 3 mm. long was used. The needle was inserted 3 mm. deep at right angles to the surface of the body. Thirty minutes after the inoculation an incision about 12 mm. long and about 9 mm. deep was made exposing the locus of the virus injected and the needle track. The open wound was then treated.

Method 3. In this procedure an incision was made with a scalpel in the muscles on the back of the neck slightly anterior to the shoulder blades in each guinea pig. The incision was about 12 mm. long and about 6 mm. deep. Immediately after the wound was inflicted, approximately 0.2 cc. of a virus suspension was deposited in it from a syringe with an 18 gage blunt needle. Following the inoculation the wounds were slightly irritated with the tip of the needle.

Treatment of Animals Inoculated with Rabies Virus.—Fuming nitric acid, 20 per cent aqueous solution of soft soap,[10] tincture of iodine and powdered sulfanilamide were used to treat the wounds of the animals after they were inoculated with rabies virus. The application of the nitric acid was made by means of a glass rod drawn out to about 1.5 mm. in diameter and 40 mm. in length. This glass applicator was dipped in fuming nitric acid to the depth of about 10 mm. and then applied to the wound. The clotted blood was removed from the wounds before the acid was applied. The irrigation with the soap solution was carried out with either 20 or 50 cc. syringes fitted with 16 gage hypodermic needles 65 mm. long. The wounds were irrigated under the pressure produced by the application of the full force of the hand to the plunger of the syringe. A small hole was drilled in the bottom of a 250 cc. beaker, through which the needle was inserted into the beaker. By holding the beaker in an inverted position over the wound of the animal it was possible to carry out the irrigation without allowing the spray to endanger the operator. The volume of the soap solution that was used is stated in reference to each experiment. The iodine was applied with a cotton swab on a wooden applicator. The methods of treatment with sulfanilamide are described in detail in the protocols of experiments 17 and 18.

The application of the fuming nitric acid to the wound caused severe burns and extensive scarring in most of the animals. The wounds healed slowly, requiring about twenty-eight days for complete healing. Consequently it was not possible to apply any more of the acid than could be picked up by one dipping of the applicator without causing death. The treatment with the soap solution, the tincture of iodine or the sulfanilamide did not cause any apparent toxic effects. The wounds healed much sooner than those treated with the fuming nitric acid, and scarring was minimal. In each method of treatment the wounds were allowed to heal without being bandaged.

Methods of Diagnosing Rabies.—Since the clinical symptoms shown by guinea pigs and mice that develop experimental rabies cannot be considered definitely pathognomonic, laboratory methods were employed to establish the diagnosis of rabies in the animals that died. Two such methods were used. In those experiments in which the animals were inoculated with street rabies virus a diagnosis of rabies was established by the detection of Negri bodies in the brain tissue. The brain smears were prepared and stained for Negri bodies by Sellers' method.[11] In most of the experiments in which the animals were inoculated with S-1 fixed rabies virus the diagnosis of rabies was confirmed by the neutralization test.[12] This test, which was made only on representative animals, was conducted as follows: One part of a 1:100 dilution of the virus infected guinea pig brain was combined with two parts of antirabic serum. The mixture was incubated at 37.5 C. for one hour. During the incubation period it was thoroughly shaken every fifteen minutes. Then 0.03 cc. of the mixture was injected into each of at least 3 mice by the subdural route. The test was controlled by using normal rabbit serum in place of the antirabic serum. In addition, the brains and heart bloods of representative animals that died in each experiment were studied culturally for bacterial infection. When contamination was encountered, the pathogenicity of the organism was determined by animal inoculation.

EXPERIMENTS

The preliminary experiments were conducted with the five strains of rabies street viruses which were isolated in our laboratory and which were found to be infectious for guinea pigs and mice by intramuscular inoculation. Four hundred and seventy-five mice and 75 guinea pigs were used. The mice were inoculated by

10. The soap used in these experiments was purchased from the Industrial Soap Company, St. Louis.

11. Sellers, T. F.: A New Method for Staining Negri Bodies of Rabies, Am. J. Pub. Health **17**: 1080-1081 (Oct.) 1927.

12. The antirabic serum used in experiments 1 to 5 was supplied by Dr. Harald N. Johnson of the Alabama State Health Department. The antirabic serum used in the remaining experiments was prepared in our laboratory.

method 1 and the guinea pigs by methods 1, 2 and 3. From 5 to 50 per cent of the control mice developed rabies. In the control guinea pigs that were inoculated by method 1 the mortality was about 1 per cent, and in those inoculated by the other two methods the mortality ranged from 15 to 80 per cent. In addition, a large number of the treated mice died in which a diagnosis of rabies could not be established. These deaths were attributed to the small size of the animals, which involved exposure of a relatively large percentage of their body surfaces to the burning and toxic effects of fuming nitric acid, soap solution or tincture of iodine. In view of these results it was apparent that these studies could not be successfully conducted with either mice or our strains of street viruses. Consequently the work with mice and the street viruses was discontinued, and the subsequent experiments were conducted with the S-1 fixed rabies virus and guinea pigs.

TABLE 1.—*Results in Guinea Pigs Inoculated with S-1 Rabies Virus and Treated About Thirty Minutes Later*

Experiment	Guinea Pigs Treated by Method 3 with: Fuming Nitric Acid	20% Soap Solution	Tincture of Iodine	Untreated Controls
1	5/5*	5/5	...	2/5
2	10/10	9/10	...	3/10
3	9/10	10/10	7/10	3/10
4	9/10	10/10	10/10	3/10
5	10/10	9/10	10/10	5/10
6	7/10	6/10	...	5/10
7	15/20	18/20	27/30	8/20
Number survivors/number used	65/75	67/75	54/60	29/75
Per cent not developing rabies	80.2	93.8	90.0	36.9

* The numerator is the number of guinea pigs that did not develop rabies, the denominator the number of guinea pigs used.

EXPERIMENTS 1 to 6.—The guinea pigs in these experiments were treated about thirty minutes after they were inoculated with rabies virus. Two hundred and twenty-five guinea pigs were used, and they were distributed among the experiments as shown in table 1.

In each experiment the guinea pigs were inoculated with S-1 rabies virus by method 3. An incision was made in the muscles on the back of the neck slightly anterior to the shoulder blades in each animal and then 0.2 cc. of a 10 per cent suspension of the virus was deposited in the wound. If hemorrhage had occurred, the clots of blood were removed before treatment was begun. The fuming nitric acid was applied to the wounds by carefully probing them with the glass applicator after dipping it in the acid. A cotton swab was used for the application of the tincture of iodine. The wound of each animal treated with the soap solution in experiments 1 to 4 was irrigated with about 60 cc. of the soap solution, while in experiments 5 and 6 about 120 cc. was used. The control guinea pigs were inoculated by the same procedure but their wounds were not disturbed after the inoculation with virus.

A diagnosis of rabies was established in representative guinea pigs that died in each experiment by means of the neutralization test with antirabic serum. The heart bloods and brains of representative animals in each experiment were studied culturally and pathogenic bacteria could not be found.

The results of experiments 1 to 6 show (table 1) that 89 per cent of the guinea pigs that were treated with fuming nitric acid, 93 per cent of those treated with soap solution and 90 per cent of those treated with tincture of iodine, compared with 37 per cent of the control animals, did not develop rabies. The results of treatment with tincture of iodine compared favorably with those obtained with fuming nitric acid and with soap solution. They are, however, less conclusive because a smaller number of animals were treated with it. Since the application of tincture of iodine to open wounds causes discomfort and in some instances chemical burns, it was decided to limit further studies with it.

As shown in these experiments (table 1) the application of fuming nitric acid, 20 per cent solution of soft soap or tincture of iodine to wounds about thirty minutes after they were inoculated with rabies virus was of decided value in preventing rabies. It is not always possible, however, to treat human beings or animals within thirty minutes after they have been bitten by a rabid animal. For this reason it was desired to determine what effect these agents would have when applied two or six hours after the animals were inoculated with rabies virus.

EXPERIMENTS 8 to 12.—In these experiments the guinea pigs were inoculated with S-1 rabies virus by method 3 and they were treated about two hours after inoculation.

Two hundred and eighty guinea pigs were employed, and they were distributed among the experiments as shown in table 2. Each animal received 0.2 cc. of a 20 per cent suspension of the virus. The control animals were inoculated with the virus by the same procedure but they did not receive treatment.

The experiments were conducted in the same manner as experiments 1 to 7 except that approximately 80 cc. of the soap solution was used to irrigate the wound of each animal that was treated with the soap in experiments 8 and 9 and about 200 cc. in experiments 10, 11 and 12.

The rabies virus used in these experiments was identified by the neutralization test with antirabic serum. The test was performed only on representative animals from each experiment. In addition, cultural studies were made of the brains and heart bloods of representative guinea pigs from each experiment and no bacteria could be found.

As shown in table 2, in experiments 8 to 12, 81 per cent of the guinea pigs that were treated with fuming nitric acid, 85 per cent of those treated with the soap solution, 60 per cent of those treated with tincture of iodine and 26 per cent of the control animals showed no evidence of infection with rabies virus. The results of these experiments show that the application of fuming nitric acid, soap solution or tincture of iodine to the wounds of guinea pigs two hours after they were inoculated with fixed rabies virus was of definite benefit in preventing infection. The treatment with tincture of iodine was less effective than that with either of the other two substances. As in the previous experiments,

TABLE 2.—*Results in Guinea Pigs Inoculated with S-1 Rabies Virus and Treated About Two Hours Later*

Experiment	Guinea Pigs Treated by Method 3 with: Fuming Nitric Acid	20% Soap Solution	Tincture of Iodine	Untreated Controls
8	8/10*	9/10	6/10	4/10
9	7/10	6/10	6/10	1/10
10	13/20	18/20	....	0/20
11	20/20	16/20	....	7/20
12	17/20	19/20	....	10/20
Number survivors/number used	65/80	68/80	12/20	22/80
Per cent not developing rabies	81.3	85.0	60.0	27.5

* The numerator is the number of guinea pigs that did not develop rabies, the denominator the number of guinea pigs used.

however, a much smaller number of animals were treated with tincture of iodine. Consequently a fair comparison of the results cannot be made. These results also show that treatment with either fuming nitric acid or soap solution was just about as effective when it was instituted in two hours as when in thirty minutes. The slightly lower percentage of survivors among the animals treated two hours after inoculation is probably of no significance, since the percentage of survivors among the controls is also smaller in these experiments.

EXPERIMENTS 13, 14 and 15.—The guinea pigs in these experiments were treated six hours after they were inoculated with rabies virus. Sixty guinea pigs were used in each experiment, and they were divided into three groups of 20 each. The wound of each animal was inoculated with 0.2 cc. of a 20 per cent suspension of S-1 virus by method 3. The fuming nitric acid was applied to the wounds in the same manner as in the previous groups of experiments. The wound of each animal treated with soap was irrigated with about 200 cc. of the solution.

In these experiments (table 3) 63 per cent of the guinea pigs treated with fuming nitric acid, 67 per cent of those treated with the soap solution and 35 per cent of the controls did not develop rabies. The diagnosis of rabies in representative animals from experiment 14 was established by the neutralization test. The brains and heart bloods of representative guinea pigs from each experiment were studied culturally and bacterial contamination could not be detected.

TABLE 3.—*Results in Guinea Pigs Inoculated with S-1 Rabies Virus and Treated About Six Hours Later*

Experiment	Guinea Pigs Treated by Method 3 with: Fuming Nitric Acid	20% Soap Solution	Untreated Controls
13	14/20*	17/20	10/20
14	14/20	14/20	8/20
15	10/20	9/20	13/20
Number survivors/number used	38/60	40/60	41/60
Per cent not developing rabies	63.3	66.6	35.0

* The numerator is the number of guinea pigs that did not develop rabies, the denominator the number of guinea pigs used.

The results of these experiments show that either fuming nitric acid or soap solution was of pronounced benefit in preventing rabies even when applied in six hours, although considerably less effective than when it was applied in two hours or thirty minutes.

As in the two previous groups of experiments, here again the results of treatment with the soap solution were apparently slightly better than those obtained with fuming nitric acid, although the differences are not statistically significant.

EXPERIMENT 16.—In this experiment it was desired to repeat as closely as possible the technics employed by Cabot[6] and Poor.[7] The guinea pigs were inoculated as described in method 2, 0.2 cc. of a 20 per cent suspension of S-1 virus being injected into the muscle tissues on the back of the neck slightly anterior to the shoulder blades of each animal. About thirty minutes after the injection an incision was made as previously described, and the animals were treated immediately thereafter. The control guinea pigs were inoculated by the same procedure but they were not given any treatment after the incision was made.

Sixty guinea pigs were employed in this experiment. Twenty were treated with fuming nitric acid, 20 with soap solution and 20 were used as controls to determine the virulence of the virus. The fuming nitric acid was applied as in the previous experiments, and about 100 cc. of the soap solution was used to irrigate the wound of each guinea pig.

Fifty per cent of the guinea pigs that were treated with fuming nitric acid, 60 per cent of those that were treated with soap solution and 15 per cent of the control animals did not develop rabies. Brain tissues and heart bloods of representative guinea pigs were cultured and no bacteria could be detected.

The results of experiment 16 are in agreement with those reported by Poor.[7] Also they are in general agreement with the results reported by Cabot,[6] although in his studies a much larger percentage of the guinea pigs that were treated with fuming nitric acid escaped infection. Possibly this difference may be attributed to the variation in the technic used in the inoculations and treatment.

EXPERIMENT 17.—Soap solution and sulfanilamide[13] were employed for treatment in this experiment. Each guinea pig was inoculated with 0.2 cc. of a 20 per cent suspension of S-1 rabies virus by method 3. About thirty minutes later the wound of each animal was irrigated with 100 cc. of soap solution, then sponged dry and packed with 0.5 Gm. of powdered sulfanilamide. In each case immediately following treatment the wound was clipped together with metal clips. The control guinea pigs were inoculated by the same procedure but their wounds were clipped together without treatment.

Sixty guinea pigs were used in this study. Treatment was given to 30, and the other 30 served to control the virulence of the virus. Ninety per cent of the treated animals, compared with 20 per cent of the controls, did not develop rabies. Cultural studies were made of the heart bloods and brains of representative guinea pigs that died and bacterial contamination was not observed.

The results of this experiment are in agreement with those of our first group of experiments, in which treatment was carried out only with soap solution, showing that the sulfanilamide apparently did not influence the results one way or another.

EXPERIMENT 18.—Each guinea pig in this experiment was inoculated with 0.2 cc. of a 15 per cent suspension of S-1 virus by method 3. The treatment was carried out exactly as in experiment 17 except that the wounds were not irrigated with the soap solution. Before the sulfanilamide was applied, each wound was carefully and thoroughly swabbed out with cotton swabs that had been soaked in soap solution. At least four swabs were used in treating each wound.

Twenty-eight guinea pigs were used in this experiment. Of this number 14 received treatment and 14 were used as controls. Seventy-nine per cent of the animals that received treatment and 36 per cent of the controls did not show evidence of rabies. Cultural studies of the heart bloods and brains of the animals that died did not reveal any bacterial contamination.

These results show that the type of treatment employed here was considerably less effective than the type used in experiment 17. Although a comparatively small number of animals were used in this study, the results indicate that irrigation of the wounds with soap solution is much more effective in preventing rabies than cleansing the wound with cotton swabs that had been soaked in the soap solution. Here again the results indicate that the application of sulfanilamide to the wounds did not help to prevent rabies.

COMMENT

In these studies it was not possible to duplicate in every respect the natural mode of infection with rabies virus as represented in bites of rabid animals. The natural disease resulting from a bite of a rabid animal is caused by the rabies virus that is present in the saliva. It was not possible for us to employ a saliva

13. The sulfanilamide was supplied by E. R. Squibb & Sons, New York.

virus, however, because of the many difficulties involved in its procurement. Neither were we successful in our efforts to isolate from brain tissues of dogs that died of natural rabies a virus which would infect either guinea pigs or mice with any degree of consistency by intramuscular inoculation. For this reason our experiments were conducted with a fixed rabies virus which was found to cause the disease consistently by intramuscular inoculation.

A good deal of confusion exists in the literature regarding the infectivity of street and fixed rabies viruses by intramuscular inoculation. Investigators seem to be in agreement that a fixed virus is less infectious by this route. Marie,[14] Pasteur and his co-workers [15] and Genevray and Dodero [16] have shown, however, that certain strains of fixed viruses do produce rabies in animals when inoculated intramuscularly. Little information is available on the infectivity of fixed viruses in man. Athias and Franca,[17] Franca,[18] Bareggi [17] and Remlinger [19] cited cases in which death followed antirabic treatment with vaccine that apparently contained living virus. On the other hand, Remlinger [19] and Wissokowicz [20] pointed out that people have been inoculated subcutaneously and intravenously with fixed rabies viruses without becoming infected. As to natural rabies, Cornwall [4] stated that about 35 per cent of human beings bitten by rabid dogs die of rabies, and Hutyra and Marek [21] reported that about 30 per cent to 40 per cent of dogs bitten by rabid animals develop rabies. These reports are based on cases without treatment. In our own studies we tested 28 strains of street viruses isolated from rabid dog brains, and although all the strains produced rabies in guinea pigs and mice by intracerebral injection only 5 were infectious by the intramuscular route. In our experimental methods of infection, which involved exposure of cutaneous, subcutaneous and muscular tissues to these 5 strains of street viruses, the infectivity was quite irregular. It varied from 5 to 50 per cent in mice and from 1 to 80 per cent in guinea pigs. On the other hand, the S-1 fixed rabies virus consistently infected about 70 per cent of the guinea pigs following use of the same methods of inoculation. From the information available in the literature and from our own results it appears that the infectivity of a rabies virus by the intramuscular route of inoculation depends more on the strain of virus than on whether it is a street or a fixed virus.

We realize that the methods of inoculation we used did not altogether simulate the natural inoculation occurring from a bite of a rabid animal. We believe, however, that our methods did in many respects simulate the natural mode of infection. The wounds were produced in skin and muscle tissue, and in relation to the size of the animals they were deep, extensive and ragged. The virus was deposited in the wound and then worked into the muscle tissues with the tip of a blunt hypodermic needle as it might be by the teeth of a rabid animal in the course of biting.

The mortality rates in experiment 16, in which we attempted to locate and expose with an incision the virus that had been injected into the muscle tissues of guinea pigs were considerably higher than the rates in our other experiments. No doubt it would be difficult by such a procedure to reach all of the virus so that effective treatment could be applied. This would explain some of the difficulties involved in local treatment of deep and punctured wounds. It also emphasizes the necessity of using antirabic vaccination in addition to local treatment.

The application of fuming nitric acid to the wounds of the guinea pigs caused severe chemical burns and scarring in about 90 per cent. The wounds healed slowly, requiring about four weeks for complete healing. On the other hand, the wounds of the guinea pigs that were treated with soap solution, tincture of iodine or sulfanilamide healed in about two weeks without showing toxic effects or excessive scarring. Less than 1 per cent of the guinea pigs in these experiments contracted intercurrent infections.

The results of these experiments show that cauterization with fuming nitric acid of wounds after experimental contamination with rabies virus is of definite value in preventing rabies. They also show that irrigation with soap solution is of equal or perhaps slightly more value. When either agent was applied within two hours after the inoculation of the virus, only about one third as many guinea pigs developed rabies as among the untreated controls (tables 1 and 2). Treatment with fuming nitric acid or soap solution was only about two thirds as effective when applied in six hours as it was when employed after the thirty minute and two hour interval respectively.

As shown in experiments 17 and 18, sulfanilamide apparently did not aid in preventing rabies; neither did it appear to predispose to infection.

SUMMARY AND CONCLUSION

In experiments in which treatment of wounds contaminated with rabies virus was instituted within thirty minutes, only 11 per cent of those treated with fuming nitric acid and only 6 per cent of those treated with soap solution became infected, compared with about 63 per cent of the untreated controls. The application of treatment in two hours was apparently somewhat less effective, and its application in six hours was definitely less effective than when it was applied in thirty minutes.

In tests using a limited number of guinea pigs, the results of applying tincture of iodine within thirty minutes compared favorably with the results obtained following treatment with either fuming nitric acid or soap solution. However, when tincture of iodine was used after an interval of two hours it appeared to be considerably less effective than the other substances.

Packing the wounds with sulfanilamide after they had been treated with soap solution seemed to have no effect on the incidence of rabies.

The results of these experiments show that, in the treatment of guinea pig wounds that have been inoculated with fixed rabies virus, irrigation with 20 per cent solution of soft soap is just as effective as chemical cauterization with fuming nitric acid, and possibly even more effective.

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THE PREVENTION OF EAR AND NASAL SINUS COMPLICATIONS OF THE COMMON COLD

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Practically all infections of the ears and nasal sinuses are secondary to acute coryza or nasopharyngitis and are due to bacterial invasions. The primary inciting agent may be a virus, but prolongation of symptoms and complications are caused by pyogenic organisms. Nasal and throat cultures of large numbers of patients with acute coryza show that the predominating type of organism varies from year to year. A group of nurses at the Johns Hopkins Hospital during the winter of 1943 were shown by cultures to have pneumococci in the nasopharynx and pharynx three times as frequently as beta hemolytic streptococci, while during the winter of 1942 beta hemolytic streptococci had been the commoner type. In other years Hemophilus influenzae predominated.

Beta hemolytic streptococci, pneumococci and H. influenzae are the types of bacteria most commonly found in the nose and throat during acute coryza but as mentioned their incidence varies from year to year. In 1942 beta streptococci were found in 36.2 per cent of the patients examined, while in 1943 they were present in only 11.2 per cent; H. influenzae was found in 29.3 per cent in 1942 and in 12.1 per cent in 1943. The incidence of pneumococci was more nearly the same—25.8 per cent in 1942 and 34.6 per cent in 1943. These figures are based on the number of cases in which these organisms predominated in several cultures. A few colonies of beta hemolytic streptococci, pneumococci and H. influenzae may be found in cultures of an individual with no clinical evidence of infection.

Alpha streptococci, several types of gamma streptococci, Neisseria catarrhalis, diphtheroids and Staphylococcus albus and Staphylococcus aureus are found so frequently in the nose and throat of normal healthy persons that they must be regarded as the normal flora of the throat, but one or more of these types, particularly staphylococci and alpha streptococci, are not infrequently found in almost pure culture in an infected ear or sinus. The designation "normal throat flora" implies that the types of organisms mentioned are present in the cultures without predominance of any one type. It is worthy of note that in 1943 the nose and throat cultures of 11.2 per cent of the nurses with signs and symptoms of acute pharyngitis or coryza were reported as showing normal throat flora, while not a single report of this kind was made during 1942. This suggests that both acute coryza and acute pharyngitis may sometimes be due to a virus or some agent other than bacteria. So-called virus pneumonia was more prevalent in this hospital during the winter of 1943 than in 1942, but only 2 of the 12 nurses with an acute infection of the upper respiratory tract and normal throat flora had virus or atypical pneumonia.

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The incidence of nose and throat complications of coryza is steadily decreasing among the general population, owing to the widespread practice of the family physician and the pediatrician of giving sulfonamides by mouth for every acute infection of the respiratory tract. However, one of the objections to giving large doses of these drugs by mouth and thus saturating the entire body to prevent or to cure an infection in one small area is that approximately 30 per cent of the patients develop nausea, dizziness, fever, cutaneous rash or some more serious evidence of sensitivity to the drug.[1] The ideal procedure would be to use bactericidal and bacteriostatic agents locally in minor infections and reserve administration by mouth and by vein for the more serious spreading infections. Powdered sulfonamides have proved very satisfactory for local application in wounds but are not suitable for insufflation in the nose and throat during acute coryza. Drugs used in the nose should be neither too alkaline nor too acid and must in no way interfere with the movements of the cilia.

Pickrell [1a] in 1941 showed that a large burned area on the skin could be kept far more sterile by frequently spraying it with 2.5 per cent sulfadiazine in ethanolamine solution than by giving sulfadiazine tablets by mouth. The sprayed material is absorbed, and the concentration of sulfadiazine in the tissues in a localized area may be six times that in the blood stream. Thus the growth of organisms in the sprayed area is inhibited and further spread of the infection is prevented. This observation is the basis for spraying the nose and throat during the early stages of acute coryza. If the treatment is begun soon after the symptoms of infection appear and is repeated at frequent intervals, the concentration of sulfadiazine in the mucous membranes and lymphoid tissue soon reaches a level that inhibits growth of the bacteria in the region and prevents extension of the infection to the ears and sinuses.

AN INVESTIGATION OF THE METHOD

Infections of the sinuses and ears commonly follow acute coryza, and physicians are greatly in need of some simple, safe method to prevent them. A controlled study was made during the winters of 1942 and 1943 to test the value of the sulfadiazine spray when used not to prevent the common cold itself but to prevent the complications. Observations were made on 103 nurses at the training school in the Johns Hopkins Hospital. Nurses were selected because their living conditions, food and working hours were uniform and because they were available at any hour during the day for observation and treatment. A special nurse was employed to carry out the treatment as directed, since it was evident that no conclusions could be reached unless the number and the frequency of treatments and the amount of sulfadiazine solution actually sprayed into the nose and throat at each treatment were known. As a rule the nose and throat were sprayed from eight to twelve times a day for the first three days and from five to eight times daily for an additional three days. Unless the cough was unusually troublesome the treatment was omitted during the night. Irritation of the skin around the external nares was prevented by frequent application of cold cream or petrolatum. Nurses were asked to report as soon as possible after the first symptoms

1. This percentage is approximately correct for sulfanilamide, sulfathiazole and sulfapyridine, but several recent reports indicate that about 8 per cent have toxic reactions following oral or intravenous administration of sulfadiazine.

1a. Pickrell, Kenneth L.: A New Treatment for Burns, Bull. Johns Hopkins Hosp. **69**: 217-220 (Aug.) 1941.

of an infection of the nose or throat, because it is during this phase of infection that the best results are obtained.

The routine described previously [2] was followed in all cases. Without their knowledge nurses reporting with colds were alternately placed in a treated and a control group. In the treated group the pharynx and both sides of the nose were sprayed with 2.5 per cent sulfadiazine in ethanolamines solution; in the control group the solvent alone was sprayed an equal number of times. In all other respects the treatment was the same for the two groups. When patients in the control group had sinusitis, otitis, severe cough or sore throat they were at once transferred to the treated group.

Cultures were made of material from the nose, the nasopharynx and the pharynx of all patients at the first examination and daily thereafter until they were discharged—a total of fifteen to twenty-five cultures for every patient. The sulfadiazine spray usually cleared up the symptoms of an infection with beta hemolytic streptococci within twenty-four hours, and occasionally these organisms completely disappeared from the cultures after the first day of treatment. Pneumococci and staphylococci were more resistant, but evidently the drug reduces the virulence of these organisms, since the incidence of complications was much less in the treated than in the control group. Proper use of the sulfadiazine spray prevents many of the complications of the common cold. The truth of this statement is attested by the contrast between the incidence of sinusitis, otitis, laryngitis, sore throat and severe cough in the treated group, the control group and an additional group of 183 nurses who did not volunteer to take part in this study but reported at the infirmary with colds.

Incidence of Complications

	Group Treated with Sulfadiazine Spray 2.5% in Ethanolamines (59 Patients)	Control Group Treated with the Solvent (Ethanolamines 8%) (44 Patients)	Group Not Participating in This Experiment, Who Reported to Infirmary with Complications of a Cold (183 Patients)
Sinusitis	9.7%: All cleared up with no local treatment other than sulfadiazine spray	30%: Patients were transferred to treated group and in all sinusitis cleared up with no local treatment other than sulfadiazine spray	4.9% required hospitalization
Otitis	1.8%: Cleared up with no local treatment other than sulfadiazine spray	4.5%: Patients transferred to treated group and in all otitis cleared up with no local treatment other than sulfadiazine spray	8.7% required hospitalization; tympanic membrane ruptured in 1; paracentesis done in 5
Laryngitis	No laryngitis developed in any patient during treatment	2.3%: Patients transferred to treated group	5.4% required hospitalization
Sore throat	No sore throat developed in any patient during treatment	10%: Patients transferred to treated group	12% required hospitalization
Cough	8%: Cough developed during treatment	44% developed cough	Incidence not known

The incidence of sinusitis in the control group may seem high, but acute coryza is an infection of mucous membrane, and the mucous membrane of the nasal cavity is continuous with that lining the sinuses. The sinuses are infected with every cold, but symptoms of sinusitis appear only when the cilia cease to function or when a thick discharge or edema interferes with drainage. In most of the cases in which a diagnosis of sinusitis was made it was based on the findings in the antrums. When both antrums transilluminated clearly and no pus was seen under the anterior ends of the middle turbinates at the first examination but became apparent in subsequent examinations, the diagnosis was sinusitis even though the patient had no pain or fever. Every patient was examined daily with the transilluminator, the nasal speculum and the nasopharyngoscope during the period of observation. The incidence of the more severe type of sinusitis in the infirmary group (4.9 per cent) indicates that many of the 30 per cent in the control group would have recovered spontaneously even if they had not been transferred to the treated group and had not received the sulfadiazine spray. It seems equally evident, however, that in some a severe sinusitis was prevented by the use of the sulfadiazine spray.

Summary.—A controlled bacteriologic and clinical study was made to determine the effectiveness of 2.5 per cent sulfadiazine solution in ethanolamines (Pickrell's solution), used as a spray for the nose and throat, in preventing complications of the common cold. Cultures of material from the nose, the nasopharynx and the pharynx and a complete examination of the upper air passages were made before treatment was begun and daily thereafter until the patient was discharged. Without their knowledge the nurses were alternately placed in a treated and a control group. In the first group the nose and the pharynx were sprayed with the sulfadiazine solution from eight to twelve times a day for three days and from five to eight times a day for two or three additional days; in the second group the corresponding areas were sprayed an equal number of times with the solvent alone. In all other respects the treatment was the same in the two groups. The primary object of this treatment is not to cure the common cold, which is probably initiated by a virus infection, but to prevent the bacterial infections of the sinuses, the ears and the pharynx that so commonly follow it.

COMMENT

There can be no doubt that bacterial infection is the important factor in the prolongation of symptoms, the loss of time from work and the more serious complications of the common cold.

Bacteriologic studies show that the sulfadiazine spray does not sterilize the nose and throat with the occasional exception of a beta hemolytic streptococcus infection. Some strains of this organism are so sensitive to sulfadiazine administered in this way that many patients with a red, edematous pharynx and constitutional symptoms due to streptococcic infection are cured within twenty-four hours both bacteriologically and clinically by using only 20 to 25 cc. of the 2.5 per cent sulfadiazine solution as a spray.[3] To get this result the treatment must begin as soon as possible after the sore throat is noticed and while the bacteria are still on the surface of mucous membrane and lymphoid tissue and accessible to the action of the drug. The results are not so good if treatment is begun after the fourth day of the disease. Other strains of streptococci and pneumococci do not disappear or noticeably diminish in numbers in the cultures, but clinical results suggest that they lose their virulence or their ability to become virulent. Extension of infection to the sinuses, ears or larynx of properly treated patients is rare. Although H. influenzae is presumably not sensitive to the sulfonamides, certainly the incidence of complications due to this organism seems to be reduced.

2. Bordley, John E.; Crowe, S. J.; Dolowitz, David A., and Pickrell, Kenneth L.: The Local Use of the Sulfonamides, Gramicidin (Tyrothricin) and Penicillin in Otolaryngology, Ann. Otol., Rhin. & Laryng. 51: 936 (Dec.) 1942.

3. The blood level for Sulfadiazine was 1.6 mg. per hundred cubic centimeters.

Some patients object to the taste. Others complain of irritation of the skin around the external nares, which can be prevented by frequent application of cold cream or petrolatum. About 3 per cent of our patients were sensitive to the sulfadiazine spray, as evidenced by sneezing and increased rhinitis. One patient developed a generalized cutaneous rash. Another patient had definite localized tissue sensitivity: A year previously her hand had been badly burned and was treated with sulfadiazine. This treatment produced a generalized cutaneous rash, which cleared up when the drug was withdrawn. The burn healed promptly and had been perfectly well for at least eleven months when she came to us with acute coryza. After three days of spraying her nose with the 2.5 per cent sulfadiazine solution the scar on her hand became extremely red and irritated. These symptoms gradually disappeared after the sulfadiazine spray was stopped. The only manifestation of sensitivity was in the scar on her hand.

The possibility exists that general sensitivity may develop in some patients, following local application of sulfonamides for a minor ailment, which might prevent administration of these drugs by mouth for a really serious illness at some future time. No evidence of this was observed, but the subject deserves the consideration and study of members of the medical profession.

SINUSITIS AND INFECTIONS SECONDARY TO THE COMMON COLD

TREATMENT WITH STABILIZED AQUEOUS SOLUTION OF SULFATHIAZOLE SODIUM WITH DESOXYEPHEDRINE HYDROCHLORIDE

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Two years ago Turnbull [1] reported that a 5 per cent solution of the sodium salt of sulfathiazole brought greater relief from the symptoms of chronic sinusitis than any other preparation he had used. It relieved congestion, opened the nasal passages, promoted drainage and relieved pressure headaches. The use of sodium sulfathiazole appeared to be a perfectly safe procedure, and the results obtained in cases of sinusitis seemed to justify further investigation. The solution was reported unstable when exposed to light and air, as it tended to crystallize and discolor.

By adding sodium sulfite we were able to make the solution stable to light, air and heat. A vasoconstrictor was then added to the solution, decreasing congestion and thus assisting the antibacterial action of the sodium sulfathiazole. dl-Desoxyephedrine hydrochloride—discovered by Ogata in 1919 and, like the original sulfanilamide, a "sleeper" for twenty years—was found to be compatible with sodium sulfathiazole and actually to form a new sulfonamide drug, desoxyephedronium sulfathiazole.

Because of the presence of this new compound, the vasoconstrictive action of the solution was so pronounced that a concentration of only one eighth of 1 per cent of dl-desoxyephedrine hydrochloride was necessary to obtain adequate shrinkage of the acutely congested membranes of the nose. Such activation is known as synergism, and this was demonstrated by clinical and laboratory work.

Synergism permitted the use of a very small proportion of the vasoconstrictor and therefore appeared to give the optimum clinical results—shrinkage of swollen tissues, drainage and ventilation of the sinuses without the after-effects so commonly experienced with prolonged use of vasoconstrictors, such as secondary congestion of the membrane, sneezing, sleeplessness, nervousness and tachycardia. Further, the incorporation of a vasoconstrictor enabled the sodium sulfathiazole to reach the deeper layers of the nasal mucous membrane.

Our results have shown that if the solution is used early in colds many were apparently aborted and also that the pressure pains in the acutely blocked sinuses were relieved. The stable, vasoconstrictive solution used in packs in the nose on acutely swollen membranes and left in place for twenty to thirty minutes effected noticeable relief, and patients reported improvement the day following treatment instead of the usual complaints after former methods of treatment with comments of "no relief" or "worse, with a sleepless night."

CLINICAL EXPERIENCE

In our experience of over 1,000 cases of nose, throat and ear infections, the following conditions have been treated:

Sinusitis, acute and chronic: frontal, maxillary, ethmoid, sphenoid.
Rhinitis, pharyngitis, laryngitis, tracheitis, acute and chronic.
Otitis media suppurativa, acute and chronic.

In acute sinusitis with headaches and in acute head colds it is well to saturate the packs with the solution and place as high in the nose as possible without discomfort. If the nose is very sensitive, a spray of 1 per cent solution of cocaine may be used first. The patient should be lying down (modified Proetz position), and at five minute intervals instillation of from 10 to 15 drops in each side of the nose should be continued until the swollen tissues are sufficiently shrunk to give relief from pressure. This usually takes twenty to thirty minutes in severe cases. In this way a very complete shrinkage of the congested mucous membrane results without blanching, sneezing or subsequent swelling.

For home treatment patients were instructed to use spray or drops with sufficient frequency to keep the nose open. At the beginning of the treatment this often necessitated using spray or drops at five minute intervals, usually two or three times, until the deeper tissues in the nose were reached.

Chronic sinusitis was treated by irrigating the affected sinuses and following with the instillation of the solution into the sinuses, together with the use of spray or drops at home.

Acute pharyngitis and laryngitis were treated by spraying the nose and throat and, in office treatments, the larynx and upper trachea.

Acute suppurative otitis media was treated by myringotomy and medicated tampons in office treatment, and by drops in the ear and nose and in the epipharynx by the patient at home.

From the Research Laboratory, Chemical Division, Lockheed Aircraft Corporation.

1. Turnbull, F. M.: Intranasal Therapy with Sodium Salt of Sulfathiazole in Chronic Sinusitis, J. A. M. A. **116**: 1899-1900 (April 26) 1941.

Chronic suppurative ears were treated by cleaning thoroughly with peroxide, followed by insertion of tampons; home treatment consisted in the prescribed use of drops.

This type of treatment we have found safe and effective. In children the treatment has been especially effective, particularly when the nose was blocked from colds and acute or chronic sinusitis. Packs used in the swollen nose opened it up and gave relief without discomfort, so that the child soon overcame fear of treatment.

For elderly people, and in systemic involvements in which surgery is contraindicated, the therapy has offered a form of treatment that has produced considerable relief.

SAFETY AND EFFECTIVENESS IN SPECIAL CASES

Membranous Laryngitis of Alpha Streptococcus Origin.—The patient's blood count showed leukocytes 3,300 following oral administration of six tablets of sulfadiazine over a period of twelve hours. Stable sulfathiazole solution was used as a spray in the nose, throat and larynx every hour. The following day the leukocyte count had risen to 5,300 and the next day to 7,000 with clearing of the membrane in the larynx.

Variation in p_H

Compound	p_H
1% neosynephrin (Stearns)	2.5-4
Isophren solution (Brommel)	2.5-4
1% propadrine (Sharpe & Dohme)	3.8-5
3% ephedrine solution (Lilly) (single sample)	3.9
Gluco-Fedrin (Parke, Davis)	4.8-5.8
Isedrin compound (1% ephedrine sulfate) (Lilly) (single sample)	6.0
5% solution of mild protein silver (single sample)	8.9-9.1
Metaphedrin Aqueous Isotonic (Abbott) (single sample)	10.0
1% ephedrine compound in oil (Lilly) (single sample)	10.5

Values given are subject to changes dependent on the age and condition of the preparations.

The p_H of stabilized sodium sulfathiazole solution with dl-desoxyephedrine hydrochloride is 8.6-9.

Acute Infectious Mononucleosis with Acute Alpha Streptococcus Membranous Tonsillitis.—The patient was seen at the hospital on the twelfth day of the disease. The temperature was 104 F., leukocytes 14,800, polymorphonuclears 14 per cent, lymphocytes 83.5 per cent. Sulfathiazole orally with local use of stable sodium sulfathiazole solution brought the temperature to normal on the third day. A membrane which had covered the tonsil and part of the pharynx, with dyspnea, disappeared.

Six unfavorable reactions have occurred in over 1,000 cases; in 4 the nasal congestion was not relieved or was made worse, in 1 a skin reaction resulted, around the nose, in 1 there was a rise in temperature. All these patients were allergic to the sulfonamides.

ALKALINITY

Comparative study of nose drop medications shows wide variations in p_H, as presented in the table.

It is indicated that a mildly alkaline sulfonamide solution is preferable for nasal medication because:

1. The sulfonamides have the greatest bacterial action in the p_H range of from 8 to 10 (Schmelkes and Wyss [2]).

2. Ciliary motility shows greatest activity in the p_H range of 8.2-8.6 and slows down in slightly acidic solutions, p_H 6.5 or less (Negus,[3] Gray,[4] Schäfer [5]). Use of stabilized aqueous sodium sulfathiazole with dl-desoxyephedrine hydrochloride has been shown to allow ciliary action to continue for a long period of time.[6]

3. Effective concentrations of the sulfonamides are readily obtainable in mildly alkaline solutions.

TOXICITY

Hunnicutt [7] states that in the mouse there are no permanent ill effects from the use of a 5 per cent solution of sodium sulfathiazole (not stabilized); there is a pronounced inflammatory reaction the first few days and after this the effect on the mucosa is almost nil.

The olfactory membrane, which is first affected when irritating drugs are used, as Turnbull had previously found, is not injured.

The toxicity of desoxyephedronium sulfathiazole has been studied by Richards,[8] who reports that "toxicity of the compound is certainly not greater than that of desoxyephedrine itself."

BACTERIOSTATIC AND SELF-STERILIZING PROPERTIES [9]

In a test for self-sterilizing properties of the stable sodium sulfathiazole solution it was found that "there is a gradual diminution of bacteria over a period of six hours, but about one sixth of the total number inoculated still remains viable at this time."

Stable sodium sulfathiazole solution was also submitted to a cooperating university laboratory to determine if the action of sodium sulfathiazole against Staphylococcus aureus was in any way altered by virtue of its chemical combination with dl-desoxyephedrine hydrochloride. It was found that "the average percentage inhibition of hemolytic Staphylococcus aureus in tryptos broth by sulfathiazole (12.5 mg. per hundred cubic centimeters) was 73.0, and by sulfathiazole (12.5 mg. per hundrd cubic centimeters) when combined with dl-desoxyephedrine hydrochloride at p_H 7.8 was 70.3."

CLINICAL OBSERVATIONS

In acute colds, stable sodium sulfathiazole solution combined with dl-desoxyephedrine hydrochloride treatment resulted in rather prompt relief, and the duration of the infection was apparently shortened. This was also true in acute sinusitis, with less tendency to become subacute or chronic.

In chronic sinusitis many cases reacted favorably where formerly surgery would have been indicated. There is no intention to suggest that this is a cure or that it substitutes for surgery when massive pathologic changes of the membrane or bone exist, but indications are that it will greatly reduce the number of sinus surgical operations that might otherwise be necessary.

Acute suppurative otitis media has been a much less frequent complication. Chronic suppurative otitis media that has resisted other forms of treatment has cleared up without a radical mastoid operation.

2. Schmelkes, Franz C., and Wyss, Orville: The Synergistic Action of Sulfonamides, Wetting Agents and Azochloramid, J. Bact. **43**: 71 (Jan.) 1942.

3. Negus, V. E.: The Action of Cilia and the Effect of Drugs on Their Activity, J. Laryng. & Otol., September 1934.

4. Gray, J.: The Effect of Ions on Ciliary Movement, Quart. J. Microscop. Sc. **64**, 1930.

5. Schäfer, E. A.: The Essentials of Histology, 1907.

6. Reported in personal communication from the Squibb Institute for Medical Research.

7. Hunnicutt, Leland G.: Reaction of Five Per Cent Solution of Sodium Sulfathiazole, Arch. Otolaryng. **36**: 837 (Dec.) 1942.

8. Richards, R. K.: Personal communication to the authors.

9. Report by the Medical Research Laboratory of Parke, Davis & Co.

CONTINUOUS CAUDAL ANALGESIA

AN ANALYSIS OF THE FIRST TEN THOUSAND CONFINEMENTS THUS MANAGED WITH THE REPORT OF THE AUTHORS' FIRST THOUSAND CASES

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"The Poena Magna, the chief or the great pain of the Romans, which referred to the pangs of childbirth, has been the object of attack by medicine men, midwives and physicians for centuries. The fear of it in the hearts of women has been a contributing factor to childless marriages and one of the major factors of the one-child family in our present civilization. The absolute alleviation of it in selected cases has been accomplished by continuous caudal analgesia.

"The failure of medicine men and midwives to deal with this pain adequately, if at all, compelled women in labor to seek the services of physicians. The cries of women in pain, not usually fears concerning the welfare of unborn babies, have brought physicians to the bedside. With physicians came poppy leaves and bitters, wine and morphine, ether and chloroform, nitrous oxide and scopolamine, paraldehyde and the barbiturates, cyclopropane and ethylene, avertin and hypnotism. Yet women in travail still cried out through muffles of anesthesia, screens of analgesia and curtains of amnesia as they were delivered of babies in varying degrees of narcosis and anoxemia." [1]

Continuous caudal analgesia was designed to relieve the pains of labor and delivery. Properly administered, it furnishes a comfortable labor and delivery, and a vigorous, crying baby in the overwhelming majority of instances.

The history of the development of caudal and continuous caudal analgesia has been described in detail in numerous medical publications.[2]

Our purpose in this paper is to report the first 10,000 cases managed with continuous caudal analgesia in North American medical schools and teaching hospitals and to present the results of our first thousand cases so managed. It seems timely to discuss the modifications and improvements in the technic which have developed with increasing experience. It is also desired to discuss in detail the indications and contraindications based on the accumulated experience of many physicians. Finally, we desire to present frankly all the complications thus far encountered and the precautions necessary to avoid them.

The accompanying questionnaire was sent to obstetric clinics several months after we had presented teaching demonstrations in them. These reports indicated that 10,000 obstetric labors and deliveries were managed with continuous caudal analgesia with the incidence of success indicated in the results of fifty-five clinics.

The percentage of success with this method seemed to vary directly with the experience of the operator, and the percentage of complications and failures seemed to vary inversely with the experience of the operator.

In our series of 1,150 cases, 1050, or 91.3 per cent, have been managed through labor and delivery without resorting to any other form of analgesia or anesthesia. The reasons for supplementary anesthesia have been:

1. The inability to insert the needle in the canal, or faulty insertion recognized within one hour. Sixty-five cases, or 5.6 per cent.
2. Increased anxiety on the part of the patient with emotional distress, which indicated sedation and general anesthesia. Twenty-three cases, or 2 per cent.
3. The accidental escape of the needles in 5 cases, or 0.43 per cent. It was decided that reinsertion in these cases would increase the hazard of infection.
4. Cases of monsters or abnormal babies as previously determined by x-ray. Five cases, or 0.43 per cent.
5. Discontinuance of the procedure because of the reaction of the patient. One of these was a case with convulsions in which an overdosage of the drug had been given. The other was a case in which there was a manifest increase of nausea and vomiting. Two cases, or 0.17 per cent.

The other 1,050 cases were managed successfully through labor and delivery with continuous caudal analgesia. During this time the patients were usually kept on their sides. Occasionally, when the level of analgesia rose to a higher level on the dependent side, the patient was turned to the opposite side.

All the patients were offered every meal, and they were able generally to partake of fluids and nourishment before and after delivery.

Of the 1,050 patients whom we managed successfully with continuous caudal analgesia, 679 were primiparas and 371 multiparas. The average length of analgesia for primiparas was six and one-half hours and the average dosage of metycaine was 4.5 Gm. The average time of analgesia for multiparas was two hours and twenty minutes and the average dosage of metycaine was 2 Gm.

Since the introduction of continuous caudal analgesia with the malleable needle technic we have tried constantly to improve our apparatus and refine our technic in order to provide the maximum of safety to the patient, in addition to developing the facility of administration for the doctor. Some of the technical difficulties reported in the earlier part of our series were overcome with the perfection of our present instrument. While we have used this apparatus almost exclusively for all of our series, other physicians, in an attempt to prevent the recurrence of the early difficulties of needle breakage, have devised other forms of apparatus and modified technics.

Thus far from the literature there have been reported three important methods of administration of continuous caudal analgesia:

1. The malleable needle technic with the closed circuit apparatus.
2. The ureteral catheter technic with both closed and broken circuit apparatus.
3. The continuous drip caudal analgesia technic with the closed gravity apparatus.

The special malleable needle technic with the closed apparatus has been used by us in 1,000 of our cases. Of the 10,000 cases reported, this technic has been used in 6,400 cases. This is the technic of fractional dosage

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1. Pitkin, G. P.: Conduction Anesthesia, St. Louis, C. V. Mosby Company, to be published.

2. Edwards, W. B., and Hingson, R. A.: Continuous Caudal Anesthesia in Obstetrics, Am. J. Surg. **57**: 459 (Sept.) 1942. Hingson, R. A., and Southworth, J. L.: Continuous Caudal Anesthesia, ibid. **58**: 93 (Jan.) 1942. Hingson, R. A., and Edwards, W. B.: Continuous Caudal Anesthesia During Labor and Delivery, Anesth. & Analg. **21**: 301 (Nov.-Dec.) 1942; Continuous Caudal Analgesia in Obstetrics, J. A. M. A. **121**: 225 (Jan. 23) 1943. Southworth, J. L.; Edwards, W. B., and Hingson, R. A.: Continuous Caudal Analgesia in Surgery, Ann. Surg. **117**: 321 (March) 1943. Irving, F. R.; Lippincott, C. A., and Meyer, F. C.: Continuous Caudal Anesthesia in Obstetrics, New York State J. Med. **43**: 1023 (June 1) 1943. Hingson and Edwards.[3] Edwards and Hingson.[4]

in which an initial dose of 30 cc. of 1.5 per cent metycaine is used, as soon as the labor has been definitely established, to relieve subjective pain. Supplementary doses are injected at intervals varying from forty minutes to an hour and a half.

In our hands it has given increasing satisfaction with the minimum of complications. We have been able to teach this technic readily to others with greater facility than would be experienced in teaching the catheter and the continuous drip method.

Nevertheless, each method has its own merits and demerits which should be thoroughly understood before its use is attempted.

In our preliminary studies we used the following cocaine derivatives and substitutes in varying concentrations and solutions of distilled water, isotonic solution of sodium chloride, isotonic solution of three chlorides (Ringer's solution) and isotonic Ringer-metycaine modified solution: (1) procaine hydrochloride, (2) metycaine, (3) pontocaine, (4) nupercaine, (5) monocaine and (6) eucupin.

Results of Questionnaire

	North American Clinics		Authors' Series	
	Number	Per Cent	Number	Per Cent
A. Number of cases managed with continuous caudal analgesia	10,000		1,150	
B. Number of cases with complete relief of pain	8,100	81	920	80.0
C. Number of cases with partial relief of pain	1,200	12	130	12.2
D. Number of cases considered as failures	700	7	100	8.8
E. Complications to the mother:				
1. Immediate reactions following injection	210	2.1	8	...
2. Number of cases with fall in blood pressure exceeding 20 mg. of mercury in systolic reading	870	8.7	46	4.0
3. Increased nausea sometimes associated with vomiting	690	6.9	56	4.8
4. Infection at site of injection:				
(*a*) Simple cellulitis around site of injection	80	0.8	3	...
(*b*) Severe cellulitis or peridural abscess	5	0.05	1	...
5. Broken needles	30	0.3	0	...
6. Post delivery headache	40	0.4	3	...
7. Neurologic sequelae attributed to method (These include urinary retention with need for catheterization more than once post partum, residual backache, hypesthesias)	280	2.8	3	...
F. Complications to the fetus	70	0.7	3	...
G. Maternal mortality attributed to continuous caudal analgesia	4	0.04	1	...
H. Uncorrected fetal mortality	164	1.6	16	1.4
I. Fetal deaths presumed to be due to continuous caudal analgesia	2	0.02	1	...
J. Average interval between induction of analgesia and delivery: There are many answers to this question, varying from 3½ to 8 hours				
K. Observations regarding blood loss: 60 of the 68 doctors reporting indicated that the blood loss was less with continuous caudal analgesia than with other methods				

We prefer a 1.5 per cent solution of metycaine in isotonic solution of sodium chloride or isotonic solution of three chlorides because of the (1) high analgesic efficiency of the drug, (2) the reduced number of reactions that could be ascribed to the drug and (3) the rapid elimination of the drug with a quick recovery of nerve impulses and physiologic control after delivery.

However, we have found that some analgesia could be obtained with all the drugs mentioned. Procaine, pontocaine and monocaine in many instances gave results closely approximating the relief we achieved with metycaine. Recently we have reviewed all our original comparative experiments with these various drugs after the report of Irving, Lippincott and Meyer with an indicated preference for pontocaine and the report of Siever and Mousel with a preference for procaine.

We have found that the blood pressure falls have been in direct proportion with the anesthetic efficiency of the drug and are apparently due to the pharmocologic effect of producing splanchnic and lower extremity peripheral vasomotor block. We find no evidence to indicate that the blood pressure drop is associated with the toxic effect of the drug used. In the greater number of our continuous caudal injections with metycaine we did not use a prophylactic vasopressor substance as we did with procaine and pontocaine. When an obstetric patient is able to keep up her normal fluid intake during labor and when the level of analgesia is not permitted to rise above the umbilicus, less than 8 per cent of parturients will have a blood pressure drop of more than 20 mm. of mercury and this drop is usually symptomless.

In cases of persistent vomiting in labor in which dehydration is also a problem, any local anesthetic agent exerting a block of the white rami communicantes presents a hazard that must be overcome by judicious use of a vasopressor substance, intravenous fluids and oxygen when the patient has a high degree of anemia.

ANATOMIC AND PHYSIOLOGIC CONSIDERATIONS

In a comprehensive review of continuous caudal anesthesia for anesthetists we stated that:

> The anatomic proximity of the sacral hiatus to the nerves of the pelvis, perineum and the lower extremities makes this method applicable to all types of obstetric and gynecologic procedures. The peridural space surrounding the dura mater as a sleeve from the foramen magnum to the hiatus sacralis comprises the area between the dura mater and the periosteum lining the spinal canal but usually at the second sacral segment communication between these two parts is interrupted by the closure of the dura mater around the nerve trunks. In dissection of cadavers we found that the dura sometimes encircles the spinal nerves of the cauda equina and the filum terminale, with its distal sac extending no farther down the vertebral column than the fifth lumbar segment. In approximately 0.5 of 1 per cent it extends all the way to the fourth or fifth sacral segment. In these instances spinal fluid can be obtained by inserting a short needle through the sacral hiatus. While this phenomenon has been observed by one of the authors in only 9 in 2,000 caudal injections, the occurrence of anomalies and malformations of the vertebral and spinal canals should be kept in mind.
>
> On the outer surface of the dura in the epidural space, especially at the sides, are extensive venous plexuses which may be penetrated with the caudal needle. The operator should attempt to direct his needle always in the midline and just under the bony roof of the sacral canal in order to minimize this hazard.
>
> The sacral canal terminates below in the hiatus sacralis, forming a triangular opening the sides of which are marked by bony ridges known as the sacral cornua. This opening varies in different individuals. It may be abnormally large, owing to a deficiency in one or more of the vertebral arches, or it may be reduced even to the extent of complete obliteration by ossification.

We have also noticed in dissecting these peridural spaces that a median fenestrated, fibrous raphe is not uncommonly produced by the continuation of the dura along minute nerve fibers extending upward between the spines and the periosteum of the vertebral arches.

Nerve Supply to the Uterus.—The classic work of Head, Sherrington and Cleland established that the uterus derives its extrinsic nerve supply from three sources; that is, the motor fibers to the uterus are derived from the sympathetic nerves of the aortic plexus reinforced by fibers from solar, renal and genital ganglions, the sensory fibers are derived from sympathetic nerves and ganglions of the eleventh and twelfth dorsal spinal segments and the sensory and motor fibers to the cervix and also to the birth canal are found in the sympathetic and parasympathetic plexuses communicating with the second, third and fourth sacral nerves. The perineum receives its nerve supply from pudendal and perineal plexuses from the lower somatic sacral nerves. Thus a peridural injection through the sacral hiatus of 30 cc. blocks all the sensory fibers to the uterus and birth canal, but the motor fibers sending impulses from higher levels are untouched. We have substantiated Cleland's thesis in our dissection of cadavers and in our clinical observations on more than 1,000 patients. A total of 30 cc. of indigo carmine was injected into the sacral hiatus of 60 cadavers. Dissection of the peridural space in every case revealed that the dye disseminated at least as high as the eleventh and never higher than the sixth dorsal segment. Clinically it was found that when there is analgesia of the skin over the distribution of the ilioinguinal nerves (receiving components as high as the twelfth dorsal segment) and the eleventh thoracic nerves, on both sides, there is always complete subjective absence of labor pains. Usually the initial dose of 30 cc. of 1.5 per cent metycaine produces this analgesia. Unless the anesthetic solution ascends this high in the peridural space, the parturient experiences discomfort.[3]

When the analgesic agent is permitted to ascend to the higher levels of the thoracic peridural space there is diminution in the force and frequency of the uterine contractions with a retardation of the progress of labor noted. This observation has recently been substantiated with both the Murphy and Fenning tocographic determinations.

MALLEABLE NEEDLE TECHNIC AS RECOMMENDED BY AUTHORS

1. The patient is placed in the modified left lateral Sims position. The sacral and coccygeal area is cleansed with ether and prepared with one of the antiseptic tinctures.

2. The tip of the coccyx is palpated with the middle finger of the left hand, and the thumb is used to find the U or V shaped notch indicating the sacral hiatus between the sacral cornua. This is usually about 1½ or 2 inches from the tip of the coccyx. In cases in which there was a failure of the inferior sacral arches to fuse into the bony roof of the sacrum, this hiatus may be 2½ to 4 inches from the inferior caudal tip. Experience with the standard single caudal injections is a desired prerequisite for the success in the use of the continuous method.

3. The middle finger of the left hand then changes place with the thumb and marks the spot for raising the initial skin wheal.

4. A special apparatus has been developed for this procedure. The analgesic agent recommended by us is 1.5 per cent metycaine in isotonic solution of sodium chloride. Two Gm. of the drug diluted in approximately 125 cc. of saline solution in the reservoir bottle will most nearly approach this concentration. With a few cubic centimeters of this solution, skin anesthesia is obtained by raising a skin wheal with a 25 gage, and deeper infiltration to the sacrococcygeal ligament with a 2 inch 22 gage, needle.

5. The special malleable stainless steel 19 gage needle is then inserted in the midline in the direction of the hiatus at about a 45 degree angle with the skin.

6. As soon as the bevel of the needle pierces the sacrococcygeal ligament, its reinforced metal collar is depressed through an arc of 1 to 3 cm. and the needle is thrust slowly and evenly in the midline for 1 to 2 inches within the sacral canal, where its bevel should lie inferior to the lowest extent of the dural sac. This may be ascertained by measuring on the skin with the stilet the approximate extent of the needle. The point of the needle should always be below the level of the second sacral spine.

7. The small section of tubing with special adapter is then slipped over the collar of the needle. The Luer-Lok syringe is securely attached to the adapter. A careful aspiration is performed.

(*a*) Should clear spinal fluid be obtained, the needle has pierced the dura and lies within the subarachnoid space. In such event the needle should be immediately withdrawn and the case ruled unsuited for caudal analgesia for fear of producing a massive spinal injection of the analgesic drug. Anatomic anomalies with such low lying dura are rare. (In our experience this has happened only twice in more than one thousand injections.) A failure to recognize this situation would be extremely hazardous, if not fatal.

(*b*) The withdrawal of pure blood indicates that the needle has pierced a small blood vessel in the highly vascular peridural space. In this event the point of the needle should be moved until blood can no longer be obtained. Then the injection is continued cautiously.

8. The danger of intraspinal injection, with appearance of spinal fluid previously mentioned (see 7) can be minimized if a trial dose of 8 cc. of the solution is injected and further action delayed for ten minutes to see that a low spinal anesthesia does not ensue. Without relief of pain or loss of motor power in the lower extremities in ten minutes after injection, one can safely assume that the subarachnoid space was not entered.

9. After these precautions have been carried out, the hose end of the special 4 foot rubber tubing is secured over the collar of the special caudal needle. The tubing should previously have been connected to the remainder of the apparatus, all air having been expelled by filling the entire system with metycaine solution.

10. With the palm of the left hand firmly pressed over the skin area against the dorsum of the sacrum, 30 cc. of 1.5 per cent solution is slowly injected.

11. Five per cent sulfathiazole ointment is then generously spread around the collar of the needle.

Indications that the Solution Is Being Injected into the Peridural Space of the Sacral Canal.—(*a*) The patients usually experience a sense of fulness progressing to an uncomfortable sensation in one or both legs as the solution circumscribes the perineural components of the sciatic nerves. This sensation can be minimized by slower injections.

(*b*) There will be a progressive analgesia in the areas supplied by the coccygeal, hemorrhoidal, perineal, pudendal, ilioinguinal and iliohypogastric nerve. Analgesia should be complete in twenty minutes.

(*c*) There is relief of abdominal uterine cramps within five to fifteen minutes after injection.

3. Hingson, R. A., and Edwards, W. B.: Comprehensive Review of Continuous Caudal Analgesia for Anesthetists, Anaesthesiology **4**: 181 (March) 1943.

(*d*) Pronounced vasodilatation, cessation of sweating and increase in temperature of the skin of the feet will ensue within five to fifteen minutes after injection. This phenomenon is often noticed on one side several minutes before it occurs on the other.

Indications that the Solution Is Being Injected Outside the Sacral Canal.—(*a*) Failure of the injection to relieve pain within thirty minutes. (*b*) The appearance of an "injection tumor" superficial to the dorsum of the sacrum.

Supplementary Injections.—12. The supplementary injection will depend on the rate of metabolism of the drug by the individual patient. In our experience 20 cc. of additional solution injected every thirty to forty minutes is sufficient to keep the parturient comfortable for the entire course of labor. We have continued our supplementary injections for a maximum of thirty hours and for an average of seven hours.

We consider this method of analgesia to be a specialized procedure which requires special training in order to attain uniform satisfactory results.

INDICATIONS FOR THE USE OF CONTINUOUS CAUDAL ANALGESIA

There are certain obstetric conditions which indicate the use of continuous caudal analgesia for both the mother and the child.

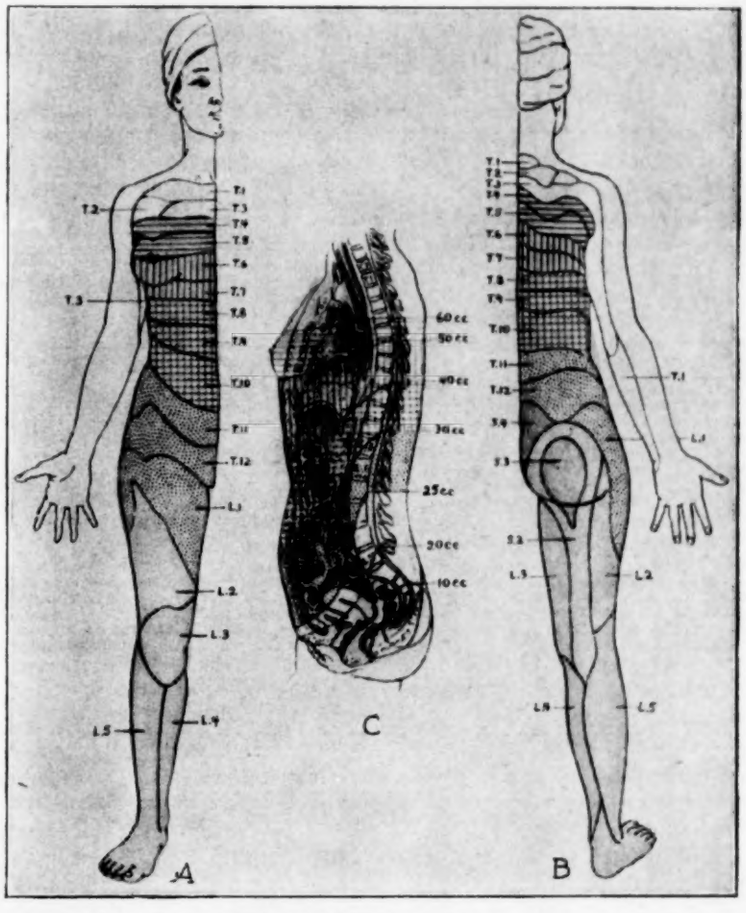
Premature Babies.—The use of any sedative, amnesic or anesthetic is contraindicated in the case of premature or small, poorly developed babies. All these drugs have been shown to be transplacental and have been rightly accused of obtunding the vital mechanisms of the fetus during and for several hours after birth. The survival of these babies is difficult enough without the addition of narcotic, hypnotic and anesthetic influence to their undeveloped respiratory and cardiovascular mechanisms.

Thus far in our series we have managed the labors of 20 women with premature infants ranging in age of development from 26 to 36 calculated weeks and from 2 to 6 pounds (0.9 to 2.7 Kg.) in weight. In only 1 of these cases was there a stillborn infant. The others breathed spontaneously after delivery. It was not unusual for these babies to cry before their shoulders were delivered during a vertex presentation, and four breech deliveries in this group were entirely satisfactory. The progress of these babies during their first postpartum days seemed to us more favorable than premature infants managed by us and in other clinics delivered through other managements.

There are certain physiologic reasons why the premature infants do so well under continuous caudal analgesia:

1. Labor is generally shorter and usually spontaneous.
2. The lower uterine segment, cervix and perineum and birth canal of the mother are completely relaxed, producing the minimum of trauma to the baby's head in passage through the birth canal.
3. Convulsive and voluntary expulsive muscular powers of the mother are not suddenly brought to bear on the contracting uterus, thus increasing the intrauterine pressure around the body or head of the baby.
4. The mothers during these labors, alert and usually cheerful, are not secreting various harmful endocrine products such as epinephrine during moments of pain, anxiety and fear.
5. The blood sugar level and fluid balance of the mothers approach normal since they are able to keep up their fluids and foods. Therefore the hazard of dehydration and hypoglycemia is not added to the dangers of prematurity.
6. The baby may be delivered deliberately with no sudden and traumatic manipulations by the obstetrician, as he controls the passage of the baby at will.
7. The minimum of blood loss and systemic shock to the mother prepares the physiologic stage for the prompt formation of maternal milk, which is vital to the premature infant.

Heart Diseases.—We were impressed early in our series with the well being of cardiac patients under continuous caudal analgesia.



Segmental analgesia produced with indicated caudal doses of 1.5 per cent metycaine solution (courtesy of Pitkin's Conduction Anesthesia).

There are certain physiologic phenomena which add to the burden of a diseased heart during the process of natural labor: (1) the emotional strain of the patient, often associated with cries of pain, (2) fear of what the next few hours will bring forth, (3) tachycardia, (4) voluntary straining. All of these increase the demand on a diseased heart. In some cases an actual decompensation with permanent myocardial damage develops. The stress and strain of labor has been known to account for an anoxemia which would contraindicate a general anesthetic.

The patient under continuous caudal analgesia, however, is at ease and does not need her voluntary expulsive efforts. The rhythmic contractions of the uterus will expel the presenting part into the birth canal and will usually deliver it to the point of perineal bulging.

From this point, outlet forceps or episiotomy will deliver the baby without adding to an already taxed circulatory system. In labor and delivery the patient remains relaxed and keeps up fluids and nourishment.

In our series we have had 2 grade 4, 3 grade 3 and 8 grade 2 cardiac patients, who have done exceptionally under continuous caudal analgesia. All of them have delivered live babies who cried spontaneously.

Use in Eclampsia.—We have used continuous caudal analgesia in 3 cases of eclampsia, 1 case of postpartum eclampsia and 8 cases of preeclampsia. In all these cases except the one of postpartum eclampsia the analgesia was begun well after labor was established.

The systolic blood pressures of all these patients ranged from 160 mm. to 260 mm. of mercury. The diastolic pressure ranged from 110 to 150 mm. of mercury. Most of the cases presented other manifestations including the presence of albumin in the urine, one or more convulsions and constricted retinal vessels with hemorrhages and complained of dizziness, headache or blind spots.

Within twenty minutes after the caudal injection was instituted there was noted:

1. A slow progressive blood pressure fall, frequently amounting to 100 mm. of mercury within one hour. Associated with this reduction in vascular tension there was a warming, blushing and drying of the lower extremities similar to that following bilateral lumbar sympathectomy.

2. There was an increase in the urinary output with a reduction in the concentration of the urine. We explain this phenomenon by the suggestion that the sympathetic nerve supply to the kidneys was blocked, with the corresponding maximum dilatation of the glomerulus and afferent arterioles.

3. Convulsions were controlled without resort to other forms of sedation.

4. The mental cloudiness of these patients cleared remarkably, they became more cooperative and 3 of them were able to take fluids and small servings of food.

5. There was no appreciable change in the heart rate of the fetus, and all of them were delivered without mortality or unusual postpartum morbidity.

Use in Cesarean Section.—Our series includes fifteen cesarean sections with continuous caudal analgesia.

The following indications for these sections are presented to illustrate the wide margin of safety in the method:

1. A twin pregnancy in a patient who had massive contractile scars from an old burn of the perineum.

2. A twin pregnancy with disproportion of the babies to the inlet. This was a case of a double breech in which one baby weighed 6 pounds 12 ounces (3 Kg.) and the other weighed 6 pounds (2.7 Kg.).

3. Two patients with viable babies and previous eclamptic convulsions.

4. Two patients with active pulmonary tuberculosis.

5. Two patients with heart disease and decompensation.

The remaining 7 were indicated because of x-ray evidence of disproportion.

There was no maternal or fetal mortality in our series. The morbidity of mothers and babies appeared to be less than usual. The blood loss was greatly reduced and comparable with that obtained with spinal anesthesia.

Since the technic of administering the caudal analgesia varied in cesarean sections from that already outlined in obstetric delivery, it is outlined as follows:

1. The patient is given no preoperative sedation or medication of any kind.

2. The drug and the dosage that we prefer consist of 1.5 per cent metycaine in 125 cc. of isotonic solution of sodium chloride or isotonic solution of three chlorides to which 6 minims (0.36 cc.) of 1:1,000 epinephrine has been added.

3. The continuous caudal needle and apparatus are inserted and handled as for obstetric analgesia.

4. An initial test dose of 8 cc. is administered with careful check by aspiration to prove that the needle is not within the subarachnoid space or a blood vessel.

5. A supplementary dose of 40 to 60 cc., depending on the size of the patient, is then administered. The patient is then placed on her back, and the level of analgesia is tested in twenty minutes.

6. If the level of analgesia has not gone above the umbilicus on both sides, a supplementary third injection of 20 to 40 cc. according to the need of the patient is administered.

7. When the level of analgesia is complete on both sides to the height of the eighth dorsal segment, the operation may be begun.

TABLE 1.—*Advantages and Disadvantages of All Technics Currently Advocated*

Technic	Chief Advantages	Chief Disadvantages
Malleable needle technic as introduced by Hingson and Edwards [2] and used by Gready and Hasseltine	1. Simplicity and safety of needle insertion and drug administration 2. Minimum of trauma to peridural space 3. Accurate control of all subsequent dosage so that each case may be individualized according to metabolism of drug by patient 4. Possibility of infection reduced through maintaining a closed apparatus throughout labor and delivery	1. Needle breakage within sacral canal (use of the special malleable needle of stainless steel, discarding it after each 5 cases) 2. Cannot be used in disoriented or uncooperative patients, as the eclamptic and patients with toxic and functional psychoses because of uncontrolled movement 3. Needle occasionally slips out during course of labor
Ureteral catheter technic as described by Adams, Lundy and Seldon (J. A. M. A. **122**: 152 [May 15] 1943) and Manalan (J. Indiana M. A. **35**: 564 [Oct.] 1942) and modified by Irving, Lippincott and Meyer [2] and Siever and Mousel [5]	1. Possibility of intrathecal injection almost nil 2. May be inserted before labor when patient is not excited or in pain 3. Definitely is method of choice in eclamptic and disoriented patients 4. For cesarean section may be inserted safely into peridural space for 6 to 8 cm. with more prompt high analgesia 5. Allows greater freedom of movement for patient in labor with diminished possibility of catheter slipping out, or producing trauma after large 13 gage needle has been withdrawn	1. Greater skill required for insertion of large needle and catheter 2. Greater incidence of peridural hematoma because of large needle 3. Large portal for potential infection opened with 13 gage needle 4. More serious consequences from penetration of bone marrow of sacral corpora, rectum and even cranial vault of baby in hands of untrained 5. Large port of entry may serve as source of leakage of solution through backflow 6. Unilateral analgesia more common, owing to deviation of catheter
Continuous (gravity) drip technic as developed independently by Block and Rotstein (J. A. M. A. **122**: 582 [June 26] 1943) and by Posner and Buch (Am. J. Surg. **60**: 396 [June] 1943)	1. Episacral insertion of needle more easily recognized since pressure with hand over dorsum of sacrum stops the flow of the gravity drip 2. Apparatus simplified 3. Necessity for repeated handling of apparatus reduced, thereby reducing possibility of infection	1. Less accurate control of analgesia 2. Necessity of constant attendance by nurse or doctor to watch level of analgesia 3. Amount of drug used during labor and delivery more, since much will leak out lower sacral and lower lumbar intervertebral foramens 4. Possibility of needle breakage or dislodging increased with patient constantly on back 5. Hazard of infection increased with patient on back to offset advantage of less handling of apparatus

8. Should the blood pressure fall below 80 mm. of mercury 25 mg. of ephedrine should be given intravenously and the patient placed in a 5 to 10 degree Trendelenburg position.

The level of anesthesia is complete on both sides to the height of the eighth dorsal segment usually about thirty minutes after the first injection. In the debilitated patients seriously ill with tuberculosis or heart disease, the procedure should be instituted forty-five minutes to one hour before operation and the level of analgesia developed more slowly.

COMPLICATIONS ASSOCIATED WITH CONTINUOUS CAUDAL ANALGESIA

Broken Needles.—In the early days of our development of this procedure we had a total of eight needles to break during the course of the administration of the analgesia. Seven of these needles broke off at the hub. These needles were malleable german silver, which were advocated in the use of continuous spinal anesthesia, and not stiff steel needles. Four of them had to be removed by surgical incision. In all these cases a second caudal needle was inserted and the analgesia continued for the completion of the labor and the delivery. There was no evidence of infection or other complications in these cases.

Since the development of our malleable stainless steel needle through a special annealing process, and since we have advocated the use of these needles in only five labors and deliveries, we have had no needle breakage in the last thousand cases of our series. However, in 3 cases in this group the metal collar became detached from the shaft of the needle. It was necessary to withdraw the needles and reinsert others to continue the procedure.

Through the cooperation of the Becton, Dickinson Research Department we have improved our needle to such a point that the possibility of breaking of the shaft or disjunction at the collar is now a remote possibility indeed. Nevertheless, other cases of needle breakage have been reported to us in which the malleable needle was used more than eight times. Likewise it has been reported to us that ureteral catheters have been broken within the canal.

This complication in the future will be minimized only by the employment of standard recommended equipment and proper technic, including the conduction of most of labor with the patient at rest on her side.

Infection.—In our series of 1,150 cases we have had one death [4] from a peridural infection at the level of the fifth lumbar and first sacral segment from which a pure culture of staphylococcus was isolated post mortem. This was the identical organism that was found in the blood cultures of the patient several days before death. Death occurred on the thirty-first hospital day, and the case has been reported in detail. We have had in addition three minor infections of the sacral and gluteal area with cellulitis and abscess formation. All of these cases cleared up under sulfonamide therapy and incision and drainage. In 1 of the cases great benefit was derived from a single treatment with x-rays.

From the 10,000 cases reported to us there were no other deaths from infection. However, there were 3 instances of peridural infection from three different clinics. All cleared up under sulfonamide therapy.

Diagnosis of peridural abscess following continuous caudal analgesia is not always an easy procedure. The attending physician should suspect this condition in instances of unexplained fever and morbidity lasting over a period of several days. From our study of this complication we believe the following measures should be instituted in all cases of infection in the peridural space following continuous caudal analgesia:

1. A repeat caudal insertion should be made with an 18 gage stiff needle in an attempt to aspirate pyogenic exudate.
2. Forty cc. of saline solution containing 75,000 units of penicillin should be injected into this space through the caudal canal on at least two occasions two hours apart.
3. In event this does not completely control the case, a surgical incision should be made over the dorsum of the sacrum and a soft rubber tube drain inserted through the first or second posterior sacral foramen. A caudal needle should be inserted and a lavage with 5 per cent sulfathiazole should be performed every hour for twelve hours.
4. Sulfathiazole or sulfanilamide in adequate doses by mouth should be instituted in cases of incomplete relief with penicillin and in cases in which penicillin is not available.

Unilateral Analgesia.—This condition occurs in 5 per cent of the cases managed by the needle technic of continuous caudal analgesia in which the patient remains on her side.

The dependent side is usually the one in which the patient has complete relief, and this may be explained by the gravitation of the analgesic solution through the foramens along the nerve trunks on this side. The following measures may be instituted to relieve this complaint:

1. A subsequent injection of an additional 20 to 30 cc. of the solution may be given and the patient turned to the opposite side immediately thereafter.
2. In some instances rotation of the needle within the canal toward the side on which the patient complains of pain will more accurately distribute the metycaine in the area where it is needed. This condition has also been reported by those who have used the catheter technic.

Bladder Dysfunction.—Thus far in our series the prolonged use of continuous caudal analgesia with 1.5 per cent metycaine has not increased the incidence of postpartum catheterization. Forty patients in our series of 1,000 have had to be catheterized more than twice during the postpartum period. Only 3 in our series of 1,150 patients have had bladder dysfunction for a period longer than one week. One patient still has retention of urine after three weeks. The care of the bladder during labor has been discussed under the heading of obstetric management. It should be emphasized that at no time should the bladder be permitted to become overdistended during the labor and always, before delivery, catheterization is performed. Nevertheless, from the 10,000 cases reported to us there have been those in which there was temporary bladder paralysis for several days post partum. In another series from a university, this complaint was present in 20 per cent of 40 cases in which metycaine has been used in distilled water. Experiments performed by us have proved that metycaine in distilled water produces a hemolysis of red blood cells.

We believe that the products of hemolyzed red blood cells in this space together with the use of hypotonic solution in long contact with nerve trunks might produce a neuritis of some of them associated with bladder dysfunction.

Backache.—This complication was prevalent in about 20 per cent of our first hundred patients, who spent all of their time in labor on their backs. Since we believe that the relaxation of the lower lumbar muscles under

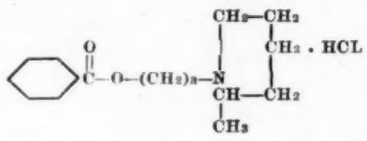
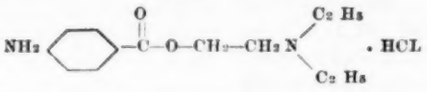
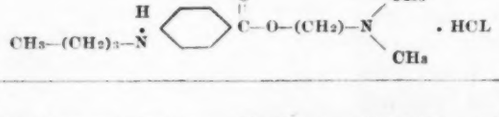
4. Edwards, W. B., and Hingson, R. A.: The Present Status of Continuous Caudal Analgesia in Obstetrics, Bull. New York Acad. Med. **19**: 507, 1943.

continuous caudal block produces an obliteration of the lumbodorsal curves or the "strut" of pregnancy with undesirable rapidity, we insist that our patients lie on their sides and have insisted that they remain on one or the other side throughout labor. They may be turned on their backs and delivered in the usual manner.

Since we have adopted this regimen the incidence of backaches during labor has diminished. About 5 per cent of our patients complain of some backache, and a few of these also have an associated pain in the neck incident to subsequent injections. These pains are transient and rapidly disappear as the analgesia becomes more intense.

slightest change in her pulse and blood pressure. Subsequently the needle was rotated and the continuous caudal analgesia was continued to a successful completion with the delivery of a vigorous baby which breathed spontaneously. The second patient had 3 Gm. of 6 per cent metycaine in 50 cc. of solution injected by mistake at a single dose. The patient developed disorientation, complete motor and sensory nerve block to the nipples and a severe convulsion which was controlled with an intravenous barbiturate. She remained in this state of complete analgesia below the nipples for a period of six hours. The baby was delivered with outlet forceps without pain to the mother, and the baby breathed

TABLE 2.—*Comparison of Analgesic Efficiency of Drugs Used*

Name and Concentration of Drug	Effectiveness of Pain Relief	Effect on Blood Pressure	Duration of Analgesia with 30 Cc. Solution	Disadvantages as Determined by Reactions and Complications
METYCAINE 1.5 per cent in isotonic solution of sodium chloride or isotonic solution of three chlorides	Profound 100 per cent pain relief; rapid in onset with complete relief often in five minutes	Blood pressure fall exceeding 20 mm. in 8.5 per cent of 10,000 cases; satisfactorily treated with ephedrine	30 minutes to 2 hours with average of 50 minutes	1. Slight increase in incidence of nausea 2. Increased bladder atony for 48 hours (reported to us, but observed by us in only 1 case)
				
PROCAINE 1.5 and 2 per cent in isotonic solution of sodium chloride	Profound 90 to 100 per cent pain relief; occasional cases not relieved with procaine would respond to metycaine	Incidence of blood pressure fall approximately the same as with metycaine; usually prevented with addition of 1:200,000 epinephrine	30 minutes to 2 hours with average of 40 minutes	1. Slight increase in incidence of nausea 2. Increased mental excitement
				
PONTOCAINE 0.25 per cent and 0.2 per cent with 1:2,000,000 epinephrine in isotonic solution of sodium chloride	Generally satisfactory, but patients still complained of slight discomfort; 80 to 90 per cent effective; slow in onset	Blood pressure fall when used with epinephrine not so constant as with metycaine	1 to 5 hours; average 70 minutes	1. Incidence of nausea definitely increased 2. Postdelivery complaints as regards hypalgesia and hypesthesia more constant
				
MONOCAINE 0.75 and 1 per cent in isotonic solution of sodium chloride	90 to 100 per cent effective	Blood pressure fall similar to metycaine when used without epinephrine and ephedrine	30 minutes to 1 hour and 30 minutes; average 40 minutes	1. Nausea increased

Dermatitis.—Thus far we have had only 2 cases of dermatitis in our series which we have attributed to metycaine. These were typical erythema multiforme lesions which cleared up spontaneously in two days. The subjective symptoms of itching were treated with calamine lotion and 1 per cent phenol. In both instances the rash developed within twelve hours after delivery in patients who had been under continuous caudal analgesia for more than six hours.

Convulsions.—In our series there have been only 2 instances of convulsions. One patient had had 3 cc. injected unintentionally into the blood vessel. She complained of tasting the drug within ten seconds and had a mild clonic convulsion with complete disorientation within twenty seconds. This condition cleared up spontaneously within a minute and a half without the spontaneously. Neurologic examinations of the mother at the end of seven days, two weeks and six weeks after delivery revealed no residual complications which could be attributed to the analgesic agent used.

Headache.—The headaches which have occurred in our series have been transient in duration. All of them occurred in cases in which the solution was being injected more rapidly in an attempt to gain a higher level of analgesia. It was determined that these headaches could be diminished or completely arrested if subsequent injections were made more slowly.

Vomiting.—Nausea and vomiting one or more times during the course of labor and delivery occurred in 20 per cent of our patients. Since many patients under all forms of sedation and without sedation in labor have a tendency to vomit with complete dilatation of the

cervix, we do not believe that this 20 per cent incidence in our series could be ascribed entirely to the drug used.

A few of our patients complained of nausea with each uterine cramp before the induction of the analgesia. After the analgesia was instituted the nausea ceased and the patients were able to retain their fluids and some servings of nutritious meals.

Several other patients became nauseated and vomited as the analgesia was near the end of its effective nerve block period.

Therefore we have concluded that nausea and vomiting during labor and delivery are in some way associated with the intensity of the pain and distress which the patient experiences. It appears that the pylorus will not function during a painful labor.

The relief of pain and anxiety will often diminish the instances of nausea. However, in 5 per cent of our cases there has been accentuated nausea and vomiting coincidental with subsequent injections of metycaine solution. These we ascribe to the toxic action of the drug on the maternal organism.

Jaundice.—We have had no instances of jaundice in the mother at any time during the postpartum period, even though some of our patients have had impaired liver function and some of them were known to be eclamptic.

Hypesthesia, Hysteria and Bizarre Reactions.—The complaint of hypesthesia includes complaints of unpleasant subjective numbness, dizziness, tinnitus, spots before the eyes, increased nervous irritability and residual postdelivery disturbances in sensation over the extremities, perineum or abdomen.

We have had only 2 patients complain of a postpartum hypesthesia. One of these patients complained that the numbness extended over both arms, the trunk and both legs. After a careful checkup by our neurologist, who found no objective evidence of this complaint, the patient declared that she felt much better and that her sensation returned completely by the third week post partum. Another patient has complained of a hypesthesia of the vaginal vault and rectal area since delivery of a baby three months ago.

A 15 year old Negro developed total hysteria, which extended from her soles to her scalp on both sides a few minutes after the initial injection. She remained in the vegetable state for a period of one hour. A few whiffs of ammonia brought her back to the state of reality a few minutes later. In this case we purposely let the metycaine wear off and let her have one hour of strong uterine pains. After this chastisement she requested more metycaine and from then on her analgesia worked perfectly.

Drop in Blood Pressure.—Patients under continuous caudal analgesia not only have a block of the nerve pathways transmitting uterine pain from the eleventh and twelfth thoracic sympathetic segments but also have a block of the upper lumbar sympathetic ganglions which produces a vasomotor dilatation of the blood vessels of the pelvic viscera and the lower extremities. This produces an increase in the volume of the vascular bed in much the same manner as would be experienced from a bilateral lumbar sympathectomy. Therefore in the hypertensive patients a definite fall in blood pressure is usual. This sometimes exceeds 80 to 100 mm. of mercury in both systolic and diastolic pressure. In individuals with normal blood pressure this fall is never so pronounced. In 80 per cent of our cases there was no blood pressure fall at all throughout either the labor or the delivery. In 20 per cent in our personal series of 1,150 cases and in 27 per cent of the reported series of 10,000 cases there was a blood pressure drop greater than 20 mm. of mercury.

Some of the physicians who have used this procedure have put a vasopressor substance in the solution. In some instances this has been 1:20,000 epinephrine and in other instances it has been 1:5,000 ephedrine sulfate or 25 mg. of ephedrine to 125 cc. of this solution. It has been our recent practice to use no vasopressor substance unless the blood pressure should fall below 90 mm. of mercury systolic. In these instances it is our practice to use 25 mg. of ephedrine at this time either intravenously or intramuscularly, depending on the need of the patient. In such a case either 25 mg. of ephedrine or 10 minims of 1:1,000 epinephrine should be added to each 125 cc. of the metycaine solution subsequently used to maintain the analgesia.

We have seen blood pressure falls with all of the recognized cocaine derivatives and cocaine substitutes for this procedure. We believe that the blood pressure fall may be attributed to the pharmaceutic action of the drug with its associated vasomotor dilatation of the blood vessels of the lower extremities and splanchnic reservoirs rather than any toxicologic effect.

Contraindications.—1. Infection over the site of the area to be injected: (*a*) furunculosis, (*b*) carbuncle or abscess over the area, (*c*) infected pilonidal cyst, (*d*) pyodermia, (*e*) fungous or Tenia versicolor infection.

2. (*a*) Anatomic anomalies of the sacrum or bony obliteration of the sacral hiatus. (This is a very rare condition which occurs less than once in 200 cases.) This condition will be found more frequently in the early part of the obstetricians' series.

(*b*) A low lying dura mater in which spinal fluid may be aspirated through the caudal needle. This is an absolute contraindication. The case should be termed unsuited for caudal analgesia and should be managed in some other manner.

(*c*) Gross deformities of the spinal column such as Pott's disease, scoliosis or exaggerated lordosis.

(*d*) Patients with sacrums having no bony dorsal arches.

3. Patients with a history of sensitivity to one of the cocaine derivatives or substitutes.

4. Patients with advanced anemia unless the procedure is to be supplemented with the periodic or continuous administration of a high concentration of oxygen. These persons should be given a transfusion of whole blood if the anemia has reached a critical stage.

5. The psychically unsuited: (*a*) patients with a history of hysteria or vasomotor instability, (*b*) epileptiform seizure, (*c*) central nervous system disease or (*d*) persons who have had meningitis or encephalitis.

6. Cases of placenta previa, unless cesarean section under this form of analgesia is contemplated immediately after its institution. The cervix and lower uterine segment in these cases will become very much softened, thereby increasing the possibility of hemorrhage.

7. Cases of bony disproportion between the pelvis and the presenting part of the fetus, unless cesarean section under this analgesia is anticipated.

8. Extremely obese persons in whom the sacral hiatus cannot be palpated. It should be emphasized

that blind prodding with a needle by the untrained physician will certainly result in disaster.

Of one hundred physicians who were given intensive postgraduate instruction in the technic of continuous caudal analgesia, ten of them stuck the needle to the side of or below the coccyx and into the rectum or pararectal tissues. One of these physicians inserted the needle through both walls of the rectum, the vagina and one lip of the cervix. Fortunately, the fact that the needle was malleable caused it to deflect away from the parietal bone of the baby.

It has been reported to us that a fatal injection of metycaine was performed with a stiff needle into the cranial vault of the baby.

It is unwise to attempt insertion of the needle more than three times in any case. Multiple punctures should not be made and if continuous caudal analgesia cannot be performed by an expert immediately with a minimum amount of physical and psychologic trauma to the patient, other forms of sedation should be used.

We are convinced that continuous caudal analgesia will give complete relief of pain to the parturient with absolute safety to her and her baby, provided the procedure is supervised by a specially trained person. We have found that the ideal person for this responsibility is an obstetrician who has been fundamentally trained in the specialized form of anesthesiology. We have also observed that in some instances the specially trained obstetrician's nurse is able to make some of the subsequent injections and to determine the progress of the parturient with absolute safety. However, the obstetrician in charge of the case should be in absolute control of the management of the procedure and should be available for consultation immediately if the patient should need him.

SUMMARY

From our experience and the accumulated experience of others we believe that the following postulates should be emphasized by all obstetricians who use this method:

1. The incidence of operative obstetrics is increased. No physician should use continuous caudal analgesia unless he is well trained in the use of forceps.

2. The incidence of posterior positions is increased to about 8 per cent because of the relaxation of the levator muscles with the resultant failure of a large number of the fetuses to rotate spontaneously.

3. The incidence of transverse arrest in the midpelvis is slightly increased because of the failure of the patient to use her auxiliary expulsive forces.

4. In the hands of the experienced, to offset the first three disadvantages, all types of operative obstetrics are facilitated because of the relaxation of the cervix, lower uterine segment and perineum. This relaxed state is not achieved by any other form of general anesthesia.

5. No oxytocic drug should be given until after the termination of the third stage of labor, because the uterus in every instance after continuous caudal analgesia contracts firmly with the delivery of the baby. Hemorrhage during the third stage is therefore definitely minimized. Gentle constant pressure on the fundus of the uterus as the placenta separates will usually expel it within two to five minutes after delivery. When oxytocic drugs are given immediately after the birth of the baby, the incidence of trapped placentas is increased.

6. Continuous caudal analgesia should be started only after labor is definitely established and the patient is in need of relief from pain.

(*a*) The head must be engaged (unless for cesarean section).

(*b*) The contractions should be occurring at five minute intervals or less.

(*c*) There should not be any disproportion between the presenting part and the pelvis.

(*d*) Progressive dilatation of the cervix 3 cm. or more should be in progress.

7. The babies born under continuous caudal analgesia are just as alert and wide awake at birth as those born to mothers who had no form of sedation or anesthesia. Many of them cry before their shoulders are born. Therefore every attempt should be made to shield the mouth and nose of these babies from aspirating fluid and mucus as their noses cross the perineum.

8. The incidence of fetal mortality and morbidity may be expected to decrease considerably, since there is apparently less birth shock to them by this than by any other method.

9. The entire course of labor is altered[5] from the pictures described in textbooks under other forms of management. The first stage of labor is definitely shortened, the third stage is shortened and simplified. However, the terminal part of the second stage of labor is greatly prolonged unless outlet forceps are used on complete dilatation of the cervix and descent of the presenting part to the perineal floor.

10. An understanding of the anatomy of the peridural space, the sacrum and the surrounding structures is essential. A thorough knowledge of the neurology of the pelvic viscera is a prerequisite. A familiarity with the pharmacology of the cocaine derivatives and substitutes used in this method is necessary. The proper interpretation of the physiology of labor as altered by continuous caudal analgesia must be studied diligently.

11. For success with continuous caudal analgesia, knowledge of the related principles of the basic sciences must be combined with a high degree of obstetric competence and a skilful application of this new technic in anesthesiology.

807 Spruce Street.

5. Siever, J. M., and Mousel, L. H.: Continuous Caudal Anesthesia in Three Hundred Unselected Obstetric Cases, J. A. M. A. **122**:424 (June 12) 1943.

Discovery of Radium.—The discovery of radium was an indirect result of the discovery of roentgen rays. In the early roentgen ray tubes the impact of the cathode rays on the glass wall of the tube produced a green fluorescence. This phenomenon suggested that there might be some relationship between visible fluorescence and invisible roentgen radiation. Jules Henri Poincaré, a physicist at the University of Paris, was the first to suggest the desirability of testing ordinary fluorescent or phosphorescent substances to see if they emitted invisible rays similar to roentgen rays. His colleague Henri Becquerel undertook a systematic investigation of these substances. They were placed on a photographic plate, which was wrapped in black paper and put aside for some hours. His results were all negative until he tested several uranium salts in this manner. With all of them a distinct photographic effect was obtained. On Feb. 24, 1896 Becquerel reported his discovery at the Academy of Sciences.—Haagensen, C. D., and Lloyd, Wyndham E. B.: A Hundred Years of Medicine, New York, Sheridan House, Inc., 1943.

Clinical Notes, Suggestions and New Instruments

LABORATORY IDENTIFICATION OF SULFONAMIDE RESISTANT GONOCOCCIC INFECTIONS

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Sulfonamide resistance is an important factor in the therapy of gonorrhea and constitutes a formidable barrier in the present campaign for the complete eradication of this disease. An analysis by Cox [1] of over 700 cases of gonorrheal urethritis in the male treated with sulfathiazole, sulfadiazine and sulfamerazine [2] shows that 70 per cent of the cases are clinically and bacteriologically negative within five days and that the remaining 30 per cent show varying degrees of resistance. The principal manifestations of sulfonamide resistance are (1) persistence of symptoms and positive cultures for from several days to many months and (2) persistence of positive cultures in asymptomatic carriers. The latter group particularly constitute a serious public health menace.

Evidence has been reported showing that factors within the invading gonococcus determine sulfonamide resistance more than constitutional factors within the host, provided drainage is adequate and that proper therapeutic measures have been taken. The Bangs,[3] Cohn, Steer and Seijo [4] and Lankford, Scott and Cooke [5] have studied the growth of gonococcus strains in the presence of sulfonamides by various methods in the laboratory. All these investigators report that in general the strains from resistant cases of gonorrhea tolerate a much higher concentration of drug outside the body than strains from responsive cases.

The aim of the work reported here was primarily to confirm the correlation of clinical and in vitro response to sulfonamides by an independent method. Since the results in a series of 32 cases gave a complete correlation, the method was then modified for the purpose of providing a simple and rapid laboratory test for the typing of cases of gonorrhea into sulfonamide responsive and sulfonamide resistant types. The test is simple enough to be carried out readily in any clinical laboratory, it can be completed in two to four days after the first examination of the patient, and finally it makes possible the prediction of the results of therapy. Most of the 32 original cases and 26 additional cases were then studied by means of the simplified test and a high degree of correlation was obtained. The original method, which was developed by two of us (W. G. and L. S.), gave a quantitative index of the sulfonamide resistance of each strain. It will be described in detail elsewhere and the strains studied by this method are reported here merely as sulfonamide resistant, responsive or partially resistant.

METHOD

Pure cultures of gonococci are obtained in the usual way, prior to therapy, using either the starch-casein hydrolysate-meat infusion medium of Mueller and Hinton [6] or chocolate-agar. From this pure culture small inoculums are streaked on a control plate of the Mueller-Hinton medium and on a series of three plates of the same medium containing sulfathiazole concentrations of 0.10, 0.25 and 0.50 mg. per hundred cubic centimeters of medium respectively.

The medium is prepared as described by Mueller and Hinton and 0.1 cc., 0.25 cc. and 0.50 cc. of a 0.1 per cent solution of sulfathiazole added to 100 cc. portions of the medium just before autoclaving. This medium should not be autoclaved for more than ten minutes at 10 pounds. The sulfathiazole solution is prepared by suspending 1 Gm. of sulfathiazole in 10 to 20 cc. of water, adding sodium hydroxide solution until a clear solution is obtained (4 to 5 cc. of first normal) and then diluting to 1,000 cc. Best results are obtained with plates less than 2 to 3 weeks old.

It is important to use an approximately standard amount of inoculum on each plate. The main source of error is the use of too large an inoculum, since this may protect susceptible strains against the action of the drug.

Fig. 1.—Simplified test with pure cultures: *A* shows a resistant strain and *B* a responsive strain. *C* shows another resistant strain (upper half of each plate) and *D* a partially resistant strain (lower half of each plate).

The plates are then incubated at 36 to 37 C. in a candle jar for eighteen to thirty-six hours and read as follows:

1. Equally or almost equally good growth on all the plates indicates a resistant strain.

2. Good growth on the control and no growth, or only traces of growth, on the sulfathiazole plates indicates a susceptible strain.

3. Good growth on the control and intermediate degrees of growth on the sulfathiazole plates, with considerably better growth on the 0.1 mg. per hundred cubic centimeters plate than on the 0.50 mg. per hundred cubic centimeters plate, indicates a partially resistant strain.

It has been found advantageous to spray the plates with a solution of the "oxidase reagent" (para-amino dimethyl aniline hydrochloride) to identify the colonies as Neisseria. Occasionally contaminants resistant to sulfathiazole and closely resembling gonococcus colonies in appearance have been encountered, but they are readily distinguished from gonococci by the use of oxidase reagent.

Photographs of plates treated in this way are given in figure 1 and show typical examples of the three types of strains, Neisseria colonies appearing black.

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Constant advice and encouragement were given by Dr. Oscar F. Cox, head of the genitourinary clinic at the Boston Dispensary, and by Dr. J. Howard Mueller, professor of bacteriology and immunology, Harvard Medical School.

1. Cox, O. F.: Chemotherapy in Gonococcal Infections, New England J. Med. **226**: 184 (Jan. 29) 1942.

2. As sulfanilamide is well known to be less effective than other sulfonamides against the gonococcus, it has not been used in the present study, and the term sulfonamide is here restricted to the three drugs mentioned.

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4. Cohn, Alfred; Steer, Arthur, and Seijo, Irma: Correlation Between Clinical and In Vitro Reactions of Gonococcus Strains to Sulfathiazole, Am. J. M. Sc. **203**: 276 (Feb.) 1942. Cohn, Alfred, and Seijo, Irma: Further Observations on the Correlation Between Clinical and In Vitro Reactions of Gonococcus Strains to Sulfathiazole, Am. J. Syph., Gonor. & Ven. Dis. **27**: 301 (May) 1943.

5. Lankford, C. E.; Scott, Virginia, and Cooke, W. R.: Studies of Sulfonamide Resistance of the Gonococcus, J. Bact. **45**: 201 (Feb.) 1943.

6. Mueller, J. H., and Hinton, J.: A Protein Free Medium for Primary Isolation of the Gonococcus and Meningococcus, Proc. Soc. Exper. Biol. & Med. **48**: 330 (Oct.) 1941.

Partially resistant strains have been found to constitute only a small fraction of the total and both the other types may be readily classified by the use of only one sulfathiazole plate. The 0.1 mg. per hundred cubic centimeters plate is preferable for selecting the most responsive strains and the 0.5 mg. per hundred cubic centimeters plate for the most resistant strain. A second drug plate is, however, useful in providing a check on the first.

Time Required.—The isolation of a pure culture requires twenty-four to forty hours and the test another twenty-four to forty hours, making a total time of two to four days. Highly resistant strains can be easily classified after eighteen hours of incubation, but the longer period of incubation gives a more reliable differentiation of partially resistant and responsive strains.

However, preliminary results obtained by Cox indicate that in cases of untreated acute gonorrheal urethritis the test may be completed in less than twenty-four hours after the first examination of the patient by using urethral swabs or urine sediment directly for the test, thereby eliminating the preliminary isolation of a pure culture. Figure 2 shows typical results obtained by this modification. Spraying the plates with the oxidase reagent is particularly useful here because of the frequent occurrence of contaminants.

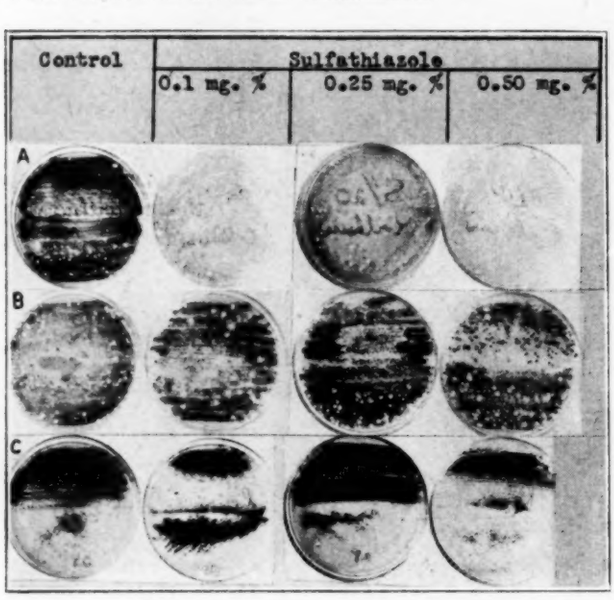

Fig. 2.—Direct streaking with urethral swabs (*A*, *B* and upper half of *C*) and with urine sediment (lower half of *C*). Strain *A* is responsive and strains *B* and *C* are resistant.

Until more cases have been studied by this new direct method it should be regarded as only presumptive evidence and the test repeated with a pure culture. It has been reported that certain species of bacteria can protect susceptible bacteria from the action of the drug in mixed culture.[7]

RESULTS

The data obtained by both the original and the simplified methods are given in the accompanying table, together with the clinical data.

Of the total 58 patients 22, or 38 per cent, were found to have resistant strains by one or the other or both methods. All these patients were decidedly resistant clinically, failing to respond to treatment in less than two to four weeks. Thirty-three patients, or 57 per cent, gave responsive strains and all these patients showed negative smears, cultures and symptoms on the first examination after therapy was started, with negative follow-ups thereafter. This examination was usually made forty-eight hours after drug was started, but occasionally the patient delayed his second visit for from three to six days.

7. Zimmerman, A., and Pike, R. M.: A Satellite Phenomenon in Mixed Cultures of Bacteria on Agar Containing Sulfonamide, J. Bact. 45: 522 (May) 1943.

The remaining 3 cases, or 5 per cent, gave partially resistant strains in vitro. Clinically, 1 resembled the resistant type and 2 were definitely intermediate, requiring approximately one week for cure.

Results Obtained by the Original and the Simplified Method, with Clinical Data

Case No.	Laboratory Result: Original Method	Laboratory Result: Simplified Method	Days of Infection Before Therapy	Previous Sulfonamide Therapy	Drug Used	Clinical Response, Days Required for Complete Cure
1	Responsive	.....	7	None	Sulfadiazine	0-1
2	Responsive	.....	1	None	Sulfadiazine	0-2
3	Responsive	.....	?	?	Sulfamerazine	0-5
4	Responsive	.....	1	None	Sulfathiazole	0-2
5	Responsive	.....	2	None	Sulfathiazole	0-1
6	Responsive	.....	0	None	Sulfathiazole	0-2
7[1]	Responsive	Responsive	4	None	Sulfadiazine	0-3
8	Responsive	Responsive	15	None	Sulfamerazine	0-2
9	Responsive	Responsive	6	None	Sulfamerazine	0-2
10	Responsive	Responsive	5	None	Sulfamerazine	0-6
11	Responsive	Responsive	1	None	Sulfamerazine	0-2
12	Responsive	Responsive	3	None	Sulfadiazine	0-2
13	Responsive	Responsive	30+	None	Sulfadiazine	0-1
14	Responsive	Responsive	18	None	Sulfamerazine	0-2
15	Responsive	Responsive	23	S. A.	Sulfadiazine	0-2
16	Responsive	Responsive	4	None	Sulfadiazine	0-5
17	Responsive	Responsive	2	None	Sulfamerazine	0-3
18	Responsive	Responsive	?	None	Sulfadiazine	0-2
19	.....	Responsive	1	None	Sulfamerazine	0-1
20	.....	Responsive	2	None	Sulfadiazine	0-5
21	.....	Responsive	4	None	Sulfadiazine	0-2
22[1]	.....	Responsive	?	?	Sulfamerazine	0-5
23	.....	Responsive	1	None	S. M., S. D.	4-5
24	.....	Responsive	3	None	S. T., S. M.	4-5
25	.....	Responsive	12	None	Sulfamerazine	0-1
26	.....	Responsive	6	None	Sulfamerazine	0-2
27	.....	Responsive	4	None	Sulfamerazine	0-1
28	.....	Responsive	1	None	Sulfamerazine	0-2
29	.....	Responsive	4	?	Sulfamerazine	0-2
22[2]	.....	Responsive	2	None	Sulfamerazine	0-3
30	.....	Responsive	2	None	Sulfamerazine	0-2
7[2]	.....	Responsive	6	None	Sulfadiazine	0-7
31	.....	Responsive	2	None	Sulfamerazine	0-2
32	Resistant	.....	5	Yes ?	Sulfadiazine	?
33	Resistant	.....	?	S. T., S. A.	Local	90+
34	Resistant	.....	?	None	Sulfadiazine	35
35	Resistant	.....	?	Yes ?	Local	30+
36	Resistant	.....	10	?	S. T., S. D.	30+
37	Resistant	Resistant	2	None	Sulfadiazine	14+
38	Resistant	Resistant	0	None	S. T., S. D.	150+
39	Resistant	Resistant	11	None	S. T., S. M.	26
40	Resistant	Resistant	1	None	S. D., S. T.	37
41	Resistant	Resistant	4	None	S. D., S. T., S. M.	200+
42	Resistant	Resistant	?	S. T.	Local	90+
43	.....	Resistant	1	None	S. M., S. D.	35+
44	.....	Resistant	3	None	S. M., S. T.	60+
45	.....	Resistant	1	None	S. M., S. D.	60+
46	.....	Resistant	1	None	Sulfamerazine	13+?
47	.....	Resistant	2	None	Sulfamerazine	38+
48	.....	Resistant	2	None	Sulfamerazine	20+
49	.....	Resistant	300+	Yes ?	None	23+
50	.....	Resistant	3	None	Sulfamerazine	21+
51	.....	Resistant	4	None	Sulfamerazine	60+
52	Resistant	Resistant	3	None	Sulfadiazine	30+
53	Resistant	Resistant	0	None	Sulfamerazine	38
54	.....	Par. resistant	16	Yes	S. M., S. D.	60+
55	Par. resistant	.....	4	None	Sulfadiazine	5-6
56	Par. resistant	.....	11	None	Sulfadiazine	5-7

Two patients each had two infections as denoted by the superscripts on the case numbers.

Cultures were obtained before sulfonamides were administered in the clinic in all cases but 4 from the sulfonamide resistant group. In an additional 4 resistant cases and 1 responsive case sulfonamides were taken before admission to the clinic.

Several incidental findings are worth noting:

1. In this series of cases no relationship was found between the speed of cure with sulfonamides and the time after onset of symptoms at which sulfonamide therapy was started. In other words, it appears that a responsive case will respond immediately at any stage of the disease, while a resistant case will run its course no matter how soon sulfonamide therapy is started. Case 15 is worthy of special mention in this connection. This was the only responsive case in which drug had previously been administered, 50 sulfanilamide tablets, and these without success. On the twenty-second day of symptoms sulfadiazine was given and an immediate cure within twenty-four hours resulted. A culture taken just before drug was given showed a responsive in vitro picture by both methods.

2. The in vitro inhibitory powers of sulfathiazole, sulfadiazine and sulfamerazine appear to be similar, though, weight for weight, sulfathiazole is several times as powerful as either of the other two.

The strain from case 54 was first reported to be responsive by the simplified test and the method failed in this case to predict the result of therapy correctly. However, later tests showed it to have definitely more resistance than any of the responsive strains studied, and it is therefore classified as partially resistant. It is to be expected that a small percentage of cases will give strains with a small degree of sulfonamide resistance making the prognosis doubtful, but in this series all the strains except the one discussed were either decidedly resistant or responsive.

COMMENT

This method is an entirely practical typing procedure for use in the clinical laboratory, since it involves only elementary bacteriologic technic. In the hands of the average well trained technician, practically all cases of male gonorrheal urethritis can be definitely classified as sulfonamide resistant or responsive in from two to four days. An absolute bacteriologic diagnosis, including fermentation reactions, usually cannot be made in less time than this.

Of greatest importance is the fact that routine use of this test may serve as a guide in the therapy of any given case in the clinic. If the strain is responsive in vitro and the patient appears cured after one course of sulfonamide therapy, there is less need of follow-ups and he can be discharged with considerable assurance of a complete cure.

If the strain is highly resistant the patient is almost certain to respond slowly if at all to sulfonamides, and other methods of therapy are indicated. When penicillin is available for the treatment of a limited number of cases of gonorrhea,[8] this test would be useful in selecting the most sulfonamide resistant cases with a minimum loss of time.

The test is also of value in focusing attention on patients who become asymptomatic carriers. These patients, although only a small fraction of the total, are of importance not only because they are probably more apt to infect others than are patients who are frankly ill but also because they spread sulfonamide resistant strains of gonococci.

SUMMARY

1. A practical rapid laboratory method for the identification of sulfonamide resistant and sulfonamide responsive strains of gonococci has been developed.

2. Forty-four cases of male gonorrheal urethritis have been studied by this method and a high degree of correlation has been obtained between the clinical response to sulfonamides and the in vitro response of the strain to sulfonamides.

3. The advantages of the routine use of this method in the treatment of gonorrhea are that (*a*) it permits an accurate prognosis of the results of sulfonamide therapy, (*b*) prognosis of potentially successful use of sulfonamides safely permits fewer clinical check-ups and (*c*) prognosis of sulfonamide failure indicates the desirability of other forms of therapy.

8. Herrell, W. E.; Cook, E. N., and Thompson, Luther: Use of Penicillin in Sulfonamide Resistant Gonorrheal Infections, J. A. M. A. **122:** 289 (May 29) 1943.

BALANTIDIUM COLI

REPORT OF CASE WITH PROCTOSCOPIC STUDY

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OMAHA

Balantidium coli is an intestinal parasite of pigs and human beings; however, infections by this ciliate in man are comparatively rare, as is indicated by the cases reported.[1] The organisms have been found also in the intestinal tracts of orangutans and monkeys.[2] Awakian[3] found a balantidium in wild rats in Moscow, Russia. It seems therefore reasonable to assume that this parasite is a potential hazard because of its universal distribution and its numerous hosts.

In spite of the fact that the possibility for infection is great, the opportunity for proctosigmoidoscopic study of cases is not frequent because they are not readily recognized. The following case was extremely interesting to us:

M. H., a white man aged 33, a farmer, poorly developed, entered the Creighton Clinic on Jan. 7, 1941 complaining of periodic attacks of diarrhea of seventeen years' duration. The

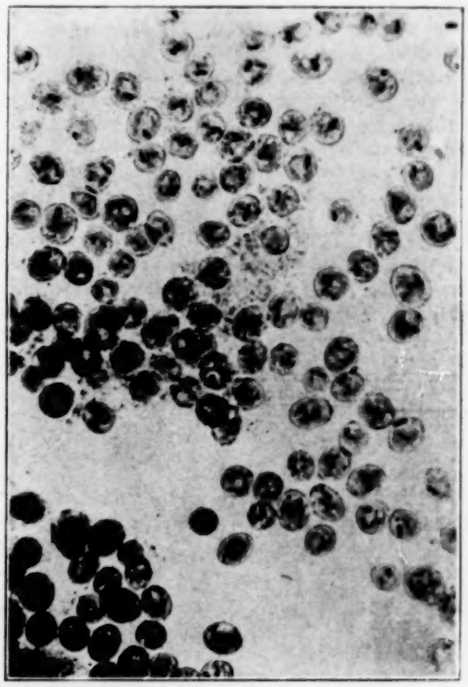

Fig. 1.—Low power view of Balantidium coli obtained by scraping the rectal mucosa of the patient. Intermixed with the organisms can be seen some of the granular and amorphous débris which was removed concomitantly.

onset occurred in 1924, while he was camping on the Iowa State Fair grounds. The stools were watery in character and contained blood and mucus. He was taken to the emergency hospital and treated for three or four days. He was dismissed when the bowel movements were again under control. He has had periods of abatement and of exacerbation since. His condition has always been worse during the winter months than during the summertime. In 1935 the patient suffered a particularly severe attack of dysentery, and a diagnosis of

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1. Nisbet, W. O.: A Case of Balantidium Coli Infection, South M. J. **13:** 403-406, 1920. Young, M. D.: Balantidiasis, J. A. M. A. **113:** 580-584 (Aug. 12) 1939. Hummel, H. G.: Amebic Granuloma of Rectum and Balantidiasis in Same Patient, Am. J. Digest. Dis. **7:** 178-179, 1940. Craig, C. F., and Faust, E. C.: Clinical Parasitology, ed. 2, Philadelphia, Lea & Febiger, 1940, p. 217. Mason, C. W.: Case of Balantidium Coli Dysentery, J. Parasitol. **6:** 137-138, 1919.

2. Brooks, H.: A Few Animal Parasites Sometimes Found in Man, Proc. New York Path. Soc. **3:** 28, 1903. Brumpt, E.: Démonstration du rôle pathogène du balantidium coli, Compt. rend. Soc. de biol. **67:** 103-105, 1909.

3. Awakian, A.: Studies on Intestinal Protozoa of Rats: Rats as Carriers of Balantidium, Tr. Roy. Soc. Trop. Med. & Hyg. **31:** 93-98, 1937.

Endameba histolytica infection was made. Emetine was prescribed, but he could not tolerate the drug so the medication was changed to acetarsone. His condition improved after the administration of this drug, and normal bowel habits were established for a brief interval. The dysenteric condition recurred but was again controlled by the administration of another course of acetarsone. Subsequent exacerbations were handled in this manner and the patient would remain symptom free for periods varying from three to four weeks.

At the time of his entrance to this clinic his complaints were frequency of bowel movements (three or four per day), soreness and cramping of the lower part of the abdomen. His diarrhea had no relation to meals or to different types of food. The physical examination revealed numerous caries in his teeth; the tongue was coated; the breath was fetid (of a peculiar odor which was noted to be similar to that coming from the bowel on sigmoidoscopic examination); the left arm and the right leg were spastic; speech was slurring. There was tenderness on deep palpation over the right lower quadrant of the abdomen.

Proctosigmoidoscopy revealed a diffuse inflammation of the rectal mucosa. In the upper third of the rectum were several irregularly shaped diphtheritic patches varying from 1.5 to 3 cm. in length and 0.5 to 1.5 cm. in width. There were also numerous small, round, white plaques; these had the appearance of bacterial colonies, as they are seen growing on an agar plate. The plaques were easily wiped off and exposed a raw, hyperemic area from which blood exuded. Scrapings from these areas when examined microscopically, on a warm stage, revealed the vegetative forms of Balantidium coli. Photomicrographs were prepared of the stained specimens (figs. 1, 2 and 3).

A low residue, high vitamin, high calory diet was ordered and carbarsone was prescribed, one tablet (0.25 Gm.) to be taken twice daily for ten days. When the patient was seen two weeks later he stated that he no longer had a diarrhea. Proctoscopy revealed only a slight hyperemia of the mucosa; the white patches had entirely disappeared. There remained

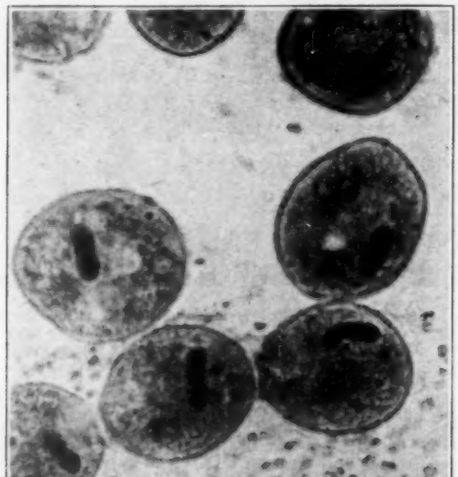

Fig. 2.—High power view of the same material as in figure 1, showing greater detail of the internal structure of Balantidium coli.

only light areas corresponding in size to the plaques and having the appearances of superficial scars. Fourteen days after the carbarsone was stopped the patient stated that he did not feel well and that he was again having frequent bowel movements. Proctoscopy showed a diffuse inflammation of the mucosa which was partially covered with a white foamy exudate. Smears taken at this time contained an abundance of very active balantidia. Another course of carbarsone was prescribed; the same results as those recorded were observed.

Since oil of chenopodium has been used with good results by some authors,[4] the following treatment was employed: The bowel was flushed with a weak solution of sodium bicarbonate and this was followed by 4 cc. of oil of chenopodium in 30 cc. of olive oil. The solution was instilled in the rectum by means of a small catheter and was retained for two hours. This treatment was again repeated in three days. Examination of

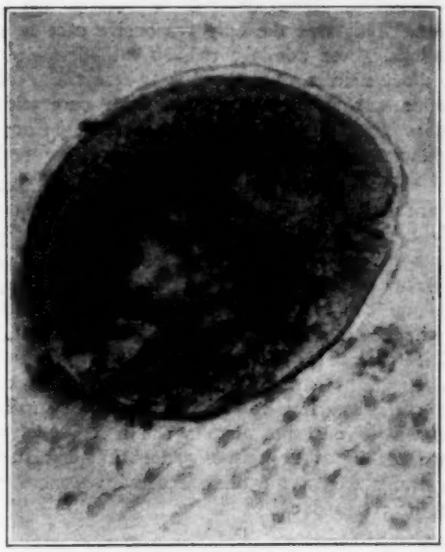

Fig. 3.—Oil immersion view of Balantidium coli showing cilia, cytostome, macronucleus, food vacuoles and surrounding granular débris.

the patient seven and fourteen days later showed that there was no improvement; however, when the amount of oil of chenopodium was doubled the mucosa appeared normal after only one week had elapsed. The patient remained free from symptoms for one month; therefore he was instructed to return to the clinic in six or eight weeks for a check-up. When he returned he again was having frequent bowel movements.

Proctoscopy revealed the same picture that was seen at the time of his first visit to the clinic.

Diodoquin tablets (Searle) were prescribed, ten tablets of 0.25 Gm. size daily for twenty days. When the patient returned at intervals of one, two, four, six and eight weeks he stated that his bowel movements were regular and that the stools were well formed. He was instructed to return in six months for another examination, provided there was not a recurrence of symptoms at an earlier date. The rectal mucosa appeared normal and Balantidium coli could not be demonstrated when he was next examined. The patient is feeling well and has gained considerable weight.

Eighteen months have elapsed since the administration of the diodoquin and there has been no return of symptoms or other evidence of the disease. The arsenicals and oil of chenopodium were of little value in the treatment of this case.

Fourteenth and Davenport streets.

4. Mason, C. W.: Personal communication to the authors. Cort, E. C.: Infection with Balantidium Coli, J. A. M. A. **90:** 1430-1431 (May 5) 1928.

Whooping Cough.—Of all the infectious diseases of childhood that occur in epidemic form, perhaps none is more important from the point of view of both morbidity and mortality than is whooping cough. The disease occurs both endemically and in epidemics and is most serious when complicated by secondary pulmonary infections; these are produced as a rule by those organisms that commonly inhabit the upper respiratory tract. When uncomplicated by secondary infection, whooping cough is rarely fatal; when death does occur it is more or less accidental and usually is due to suffocation accompanying convulsive seizures or to hemorrhage within the cranial cavity incident to the violent spasms of cough which characterize the disease.—Forbus, Wiley D.: Reaction to Injury, Baltimore, Williams and Wilkins Company, 1943.

Special Article

AMERICAN HEALTH RESORTS

CLIMATE AND DISEASE

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These special articles on spa therapy and American health resorts were prepared under the direction of the Committee on American Health Resorts. The opinions expressed are those of the authors and do not necessarily reflect the opinion of the committee. These articles may be published later as a Handbook on Health Resorts.

Certain fundamental principles of climatic effects should be kept constantly in mind when spa therapy is being considered. In many types of disease the climatic background of a spa will exercise a considerable influence over its possible benefits to the patient. Facts showing just how and why this is true have not been sufficiently appreciated by the medical profession; hence this article, setting forth the pertinent information available.

Climate is now beginning to receive the attention its importance warrants. Through its dominance of ease of body heat loss it largely determines the energy level on which man may exist in a given region, and we now know that much more than mere working ability is attached to this energy level of existence. All vital functions of the body are based on the energy derived from cellular combustion of foodstuffs, but as an energy conversion machine the body is not of high efficiency. It is thus very sensitive to the ease with which its waste heat can be thrown off, and it is here that climatic dominance is exercised. Where heat loss is accomplished easily, growth is most rapid, maturity comes early, resistance to infection is highest, energy for thought and action is most plentiful, and health assumes a positive and dynamic quality. As heat loss becomes more difficult, all these indexes of vitality are depressed and a lower, more vegetative level of existence results.

Physicians, particularly in the intense climatic contrasts of America, should have a clear understanding of these forces at work. Enlightened practice now goes far beyond the mere diagnosis and treatment of disease. Underlying most research into the treatment of disease has been the ideal of disease prevention—the maintenance of unhindered health. Among the factors influencing this maintenance of health, climatic environment probably will be found as important as adequate food supply or genetic background. Proper food is, of course, an essential requirement, but so too is the ability to utilize this food. With the lower combustion level of people in tropical warmth, more vitamins are needed to utilize each gram of food than are required for optimal response in cooler climates. Man is less energetic in warm climates, but he is a more efficient working machine and shows less evidence of bodily and mental stress. In cooler regions, where more dynamic and buoyant health prevails, the most acute and worrisome problems facing the medical profession arise from the wear and tear of too strenuous an existence.

While mean temperature level and ease of body heat loss thus dominate the energetics of life, there is a second climatic factor which in some regions seriously disturbs the smooth flow of healthful functioning. Storminess or atmospheric turbulence, with the accompanying sudden changes in temperature, pressure and humidity, is now recognized as a major disturbing factor in certain regions of the earth where cyclonic storms prevail. These sudden changes in the atmosphere seriously disrupt tissue functioning in ways as yet little understood and seem closely related to the initiation of many types of acute infectious attacks. Storm changes certainly constitute a major health factor in regions where they are frequent and abrupt, but much more evidence must be accumulated before the physiology of their effects can be clearly understood. Physicians should realize that individuals differ greatly in their sensitiveness to storm changes. Some people are utterly unfitted for existence in a stormy region and should be advised of the advantages of migration to a region of lesser turbulence.

This article is offered in the hope that it may help physicians to a clearer understanding of the workings of these climatic factors. Knowledge in this field still is in the stage of rapid expansion, but sufficient information already is at hand to warrant positive advice along several lines. The newness of much of this knowledge necessitates, for its clear understanding, a rather comprehensive presentation of the physiologic principles involved.

PHYSIOLOGIC CONSIDERATIONS OF CLIMATIC EFFECTS

Human Energetics.—The most fundamental effects of climate are exerted on the energetics of human existence, so let us first consider the body as an energy conversion machine. At all times it lives and functions only by virtue of the cellular combustion of foodstuffs. Much of this combustion energy is wasted, however, because of low working efficiency. Man himself has designed a machine of greater working efficiency than the human body. As high as 37 per cent efficiency has been reached in Diesel engines, while even gasoline motors reach the 20-25 per cent efficiency exhibited by man, the horse and dogs. The human body, however, is much more limited than are inanimate motors in the temperature range within which it can function well. Even a very few degrees of rise or fall from the normal level seriously interferes with efficient functioning.

To meet this handicap the body has developed an intricate mechanism for regulation of heat loss. Through the vasomotor control of blood supply to the skin the amount of heat reaching the body surface for dissipation can be altered with great rapidity. Normal loss from the deeper tissues by direct conduction is slow and is impeded by the insulating layers of fat encountered, but the blood with its high specific heat capacity and speedy circulation can carry internal heat to the body surface at a rapid rate. Blood flow through skin capillaries may be increased as much as thirtyfold within a few minutes when a sudden need arises. When this increased flow through the skin proves inadequate for quick elimination of the heat of combustion the sweat glands become active and make possible a still greater increase in rate of heat loss by water vaporization.

This intricate heat control mechanism functions quickly to meet sudden changes in heat production (as in bodily activity) or in the ease of heat loss (as with sudden external temperature changes). With more prolonged changes in the ease or difficulty of heat loss, however, the body adapts by an increase or decrease in its own basic rate of tissue combustion. Thus external heat that lasts only a few days calls into play only

the vasomotor and sweating mechanisms; but if such heat persists for ten days to two weeks there occurs a definite suppression in tissue combustion rate. Therein lies the chief reason why severe summer heat waves may persist for weeks but cause prostration and death in the affected population only during the first ten days.

It is this combustion rate response to the more prolonged changes in external temperature level and ease of body heat loss which holds greatest significance for man. Any decrease in total tissue combustion, enforced by difficulty in heat loss, necessarily means a curtailment of energy available for carrying out such vital functions as growth, work performance, tissue repair and the fight against infectious invasions. Such direct linking of these vital functions to tissue combustion rate and ease of body heat loss, although logical enough, has not received the appreciation its importance warrants. Indeed there has existed among medical men in America a disbelief that any such dependence really exists. This disbelief dates back to the publication of a paper by Benedict and Cathcart [1] in which they cite oxygen consumption data on 14 subjects in Boston and claim a lack of any seasonal influence. Even though their own data show a strong tendency for lowest oxygen consumption to occur in July or August, and this in Boston where summer heat is rarely severe, this article has been extensively quoted as indicating that tissue combustion rates are independent of external temperature levels.

This point is of such basic importance in any analysis of climatic effects that recently it was made the subject of a special article [2] in which the available evidence was presented and discussed. As set forth in that article the evidence points conclusively to a clear inverse relationship between tissue combustion rates and prevailing external temperature levels in both men and animals (within physiologic limits). Practically all investigators who have looked for this heat suppression of combustion rate have found it. Let us next see what it means in terms of growth and other vital functions.

Growth.—All types of experimental animals suffer a growth retardation when heat loss becomes difficult. This happens even though all factors of existence other than ease of heat loss are kept constant. Animals at 91 F. eat only about two thirds as much food as at 65 F. Herein lies the principal reason why domestic animals do so poorly in tropical warmth, giving lean, stringy meat of strong flavor. Coarseness of the tropical forage crops and leaching of soils under the heavy rainfall may be factors of considerable weight, but suppression of tissue combustion by difficulty in body heat loss is probably more important.

Children show this same retarded growth and inferior adult size under tropical heat conditions, while in the optimal coolness of middle temperate regions growth is most lusty and adult stature greatest. The close relation of such growth differences to oxygen utilization is emphasized by the pronounced differences in vital lung capacity exhibited by individuals from the two types of climate. Vital capacity in Filipino college students is only a little over half as great as that of students in the northern part of the United States.

Sexual Functions.—Onset of sexual functions and degree of fertility are closely linked to ease of body heat loss and tissue combustion level. Most rapid development and highest fertility occur at environmental temperatures around 65 F. As difficulty in heat loss comes on and growth rate slackens, we regularly see also a later onset of sexual cycles in young females, both human and animal, and lowered fertility. Animals mate freely at 90 F., but conceptions are difficult to obtain and result in small litters of puny young, while at 65 F. almost every mating results in a large litter of lusty offspring. Microscopic changes in gonadal tissues indicate that this suppression of reproductive tissue is extensive and very real. Spermatogenic activity in the testes is almost obliterated within ten to fourteen days of application of tropical moist heat. After several weeks of adaptation some recovery of function occurs but to a much lower level of activity than is seen at lower temperature levels.

Man, living under natural climatic habitats, shows just as striking sexual variations at different levels of environmental temperature as do laboratory animals. Onset of the menses in girls occurs earliest in middle temperate latitudes and comes at a progressively later age as more and more severe tropical heat is encountered. At the present time here in North America the earliest menarche is found in the upper half of the Mississippi basin. Nowhere else on earth do children grow with such lusty vigor and enter such early adolescence. Development in the Gulf states is somewhat retarded by the long summer of tropical moist heat, but most severe suppression takes place in tropical lowlands, where depressive moist heat renders heat loss difficult at all times.

Medical literature and lay belief back through the centuries, at least to the time of Hippocrates, have held that the earliest onset of the menses occurred in the tropics. Even though all recorded statistics contradict this belief, it is encountered among people of all lands, both lay and medical. Since we know it has been handed down through medical literature for two thousand years without factual support, we can well presume that it may have originated several thousand years earlier still. Only twenty thousand or so years ago present middle temperate regions had polar climates, and optimal temperature conditions for man were to be found only in what are now tropical or subtropical lands. That such beliefs, perhaps once based on real facts, can be handed down through many thousands of years without further supporting factual background is well illustrated by the ancient astrological beliefs so widely held today even among intelligent people.

Wherever human populations are exposed to seasonal swings in mean monthly temperature, highest conception rates nearly always occur when the mean temperature level is near 65 F. As mean temperatures rise above 70 F. or fall below 40 F. fertility is reduced. With really severe moist warmth, as in Japan's monsoon summer heat or in the prolonged severe heat waves in the upper Mississippi valley in North America, conceptions may be reduced as much as 50 per cent. Nor is this reduction in conceptions merely a result of less frequent intercourse in hot weather, for there occurs no significant reduction in the frequenting of houses of prostitution. Apparently both men and animals continue the mating urge in hot weather but suffer a sharp drop in biologic fertility.

Malnutrition from any cause tends to retard development of the sexual functions. Difficulty in body heat loss is no more effective in this respect than is inadequacy of available food supply, either in total amount

1. Benedict, F. G., and Cathcart, E. P.: Muscular Work; A Metabolic Study with Special Reference to the Efficiency of the Human Body as a Machine, Pub. 187, Carnegie Institution of Washington, 1913.
2. Mills, C. A.: Climate and Metabolic Stress, Am. J. Hyg., sect. A **29**: 147 (May) 1939.

or in composition, or serious childhood illnesses. The menarche usually is delayed in girls who have been subjected to any of these depressive influences during their childhood years.

Resistance to Infection.—Although such factors as malnutrition, vitamin deficiency and exhaustion usually have been thought important in determining the body's ability to fight infection, there has been little apparent inclination to consider tissue combustion level. Yet such a relationship would seem logical, since all vitality factors must have their functional basis in the energy liberated from such combustion. It is infectious disease which kills people living under depressing tropical warmth, while the more energetic residents of middle temperate regions die mainly from the degenerative and breakdown ailments. In 1932 we showed that ability to survive tuberculous infection was decidedly higher in Cincinnati residents who were born in the North than in those born in the Gulf states. Dealing only with deaths of tuberculosis among the indigent population of Cincinnati, it was shown that the survival time from first symptom to death was almost twice as long in patients born in the northern part of the United States or North Central Europe as in those born in the Gulf states of North America or in the Mediterranean countries of Europe. Ability to survive attacks of acute appendicitis also is considerably higher in the North than in the South.

Human disease statistics, however, are influenced by too many extraneous factors to be of any great value in determining climatic effects, unless they can be substantiated by studies on experimental animals under carefully controlled conditions. Human data may supply indications of existing differences or trends, but conclusive proof in such a matter must come from laboratory studies. Fortunately such studies [3] have now shown that ability to fight infection is definitely higher under conditions that facilitate body heat loss than it is where heat loss is difficult. With all other existence factors except ease of body heat loss held constant, practically all mice adapted to 90 F. will be dead after inoculation with a given dose of pneumococcus organisms before those adapted to 65 F. even begin to succumb. If one uses a less lethal organism, such as a hemolytic streptococcus, the minimum lethal dose for the 65 F. mice is found to be about four times as great as it is for those kept at 90 F. Antibody production after thyroid vaccine injection into rabbits is almost twice as great in animals kept at the lower temperature.

Locke [4] has provided support also for the idea that the combustion level is an important factor in determining resistance to infection. He found that ability of animals to survive pneumococcus inoculation or of human beings to maintain freedom from respiratory infection was related directly to their rate of oxygen utilization. The matter needs more thorough study, but in the main it would seem that man's susceptibility to infection and his chances for survival are conditioned rather strongly by his ease of body heat loss and the resulting tissue combustion level allowed him. Temperate zone man does not, then, enjoy greatest freedom for respiratory disease during the summer months because of better tissue vitality as has been so commonly supposed. Actually the fatality rate per hundred cases of acute appendicitis is almost twice as high in summer heat as in winter cold, and tuberculosis runs its most rapid course when symptoms of disease activity first appear in summer heat. It now seems almost certain that the summer freedom from respiratory infection is attributable in very large part to the lessened storminess of that season and the greater freedom from body chilling.

Sensitivity to Heat.—In addition to the profound effects on tissue combustion rate and body functions exerted by moderate difficulties in heat dissipation, there are also more acute disturbances brought by excessively high environmental temperatures. Such disturbances are predominantly problems of middle temperate latitudes. This is true for two reasons, both of which are involved in an explanation of the physiology of these excessive heat effects.

The first reason is that man's own internal heat production is highest in temperate regions and his necessity for rapid heat dissipation greatest. Either animals or men adapted for weeks or months to cool surroundings develop a high combustion rate, and this proves embarrassing when sudden difficulty in heat loss is encountered. People residing in tropical moist heat have adapted themselves to a lower rate of heat production, and acute heat effects there are seldom seen except in newcomers from cooler regions. Severe heat waves of summer come on middle temperate populations suddenly and sometimes kill thousands before their body heat production can be brought down within their capacity for dissipation under the difficult conditions suddenly prevailing. Particularly prone to this embarrassment from the sudden heat are the less resilient sclerotic patients and those of limited cardiac capacity. Increased peripheral circulation to facilitate the loss of internal heat throws a greater burden on the heart, and hence the heat wave dangers for those with heart trouble.

Animal and human studies have shown that ten days to two weeks are required for any considerable subsidence of basic internal combustion in response to external heat. Population masses demonstrate this delay in adaptation by being able to stand considerably more severe heat in August than in June or early July. In fact, most heat stroke epidemics occur in early July rather than in the hotter weather of August. But if a severe July heat wave was to be inflicted on these same populations at the height of their winter activity, its effects would be truly devastating—perhaps as much as would a North Dakota winter suddenly inflicted on the people of Manila, Singapore or Calcutta. It is, then, the prevailing internal heat production rate of man that largely determines his sensitivity to acute heat effects when faced suddenly with severe external warmth.

The second factor responsible for the greater prevalence of acute heat effects in temperate latitudes is that most severe heat actually occurs there. Dry bulb temperatures of over 100 F. are rare in tropical regions except in desert areas, while temperatures above this level are not unusual during severe summer heat waves as far north as the prairie provinces of Canada. Heat deaths and prostration occur mostly in urban and desert regions and for somewhat similar regions. With the dense vegetation of tropical lowlands, and less so in rural temperate areas, the physical surroundings of man have a high water content. Green foliage is largely water, and the high heat capacity of water enables it to absorb large amounts of radiant heat from the daytime sun with little rise in temperature. Baked earth, desert sands and urban building or paving materials have a very low specific heat and suffer a material rise of

3. Mills, C. A.: Climate in Health and Disease, Oxford Medicine Series, vol. I, chapter XI, pp. 453-500 (15).

4. Locke, Arthur: Lack of Fitness as the Predisposing Factor in Infections of the Type Encountered in Pneumonia and in the Common Cold, J. Infect. Dis. **60**: 106 (Jan.-Feb.) 1937.

temperature under the radiant heat load from the sun. In desert regions this daytime heat is quickly reradiated off into space soon after sundown, but in built-up urban areas it tends to be trapped within buildings and to cause progressively higher temperatures as the heat wave persists day after day. Building construction in tropical cities takes account of this danger and provides for ample air currents to carry away any such daytime heat that gains access; but in temperate zone cities winter cold prohibits this open type of construction, and the trapping of daytime radiant heat makes the heat problem for urban dwellers worse with each added day of a summer heat wave.

Lack of space prevents full consideration of the physiologic and therapeutic aspects of heat stroke, heat exhaustion and heat cramps. Those particularly interested can find the matter treated in detail elsewhere.[5] One point of great importance is the protection against severe heat afforded by a high intake of the B vitamins. Thiamine 10 mg. a day has been found much more effective than salt tablets in warding off the effects of severe heat, but it is probably safer to increase the intake of all the B fractions.

Vitamin Requirements.—Since human vitality and energy level seem so dependent on ease of body heat loss and tissue combustion rate, it is well to look into the combustion process itself. Perhaps tissue requirements for the combustion catalysts are higher when the combustion rate is slowed down by difficulty in heat loss. With the lowered food intake of hot climates or in summer heat it may well be that a higher dietary content of thiamine and other combustion catalysts of the vitamin B group is needed to maintain optimal concentration for proper tissue oxidative processes. It has quite generally been considered, largely as a result of Cowgill's studies, that thiamine requirement is determined by the amount of dextrose there is to be burned, that a more or less constant ratio exists between thiamine requirement and total nonfat calories of the diet. His studies, however, and those of others in this field were carried out at approximately optimal environmental temperatures for the animal subjects, so that there was no way of knowing whether this ratio might not vary as external temperatures were raised or lowered.

In more recent studies on this point it has, in fact, been found that the optimal requirement for dietary thiamine is twice as high at 91 F. as it is at 65 F. Animals show definite inadequacy in the heat at dietary thiamine levels twice as high as those at which inadequacy appears in a cool environment.

With animals on vitamin free synthetic diets to which have been added the known B vitamins in pure form, those kept at 65 F. seem not to miss the unknown B fractions ordinarily supplied to them as liver extract. Addition to their diet of liver extract or the newer B fractions (inosite, para-aminobenzoic acid, choline, biotin) seems to make little difference in growth rate or development. In the heat, however, these newer and unknown fractions have now been found badly needed.

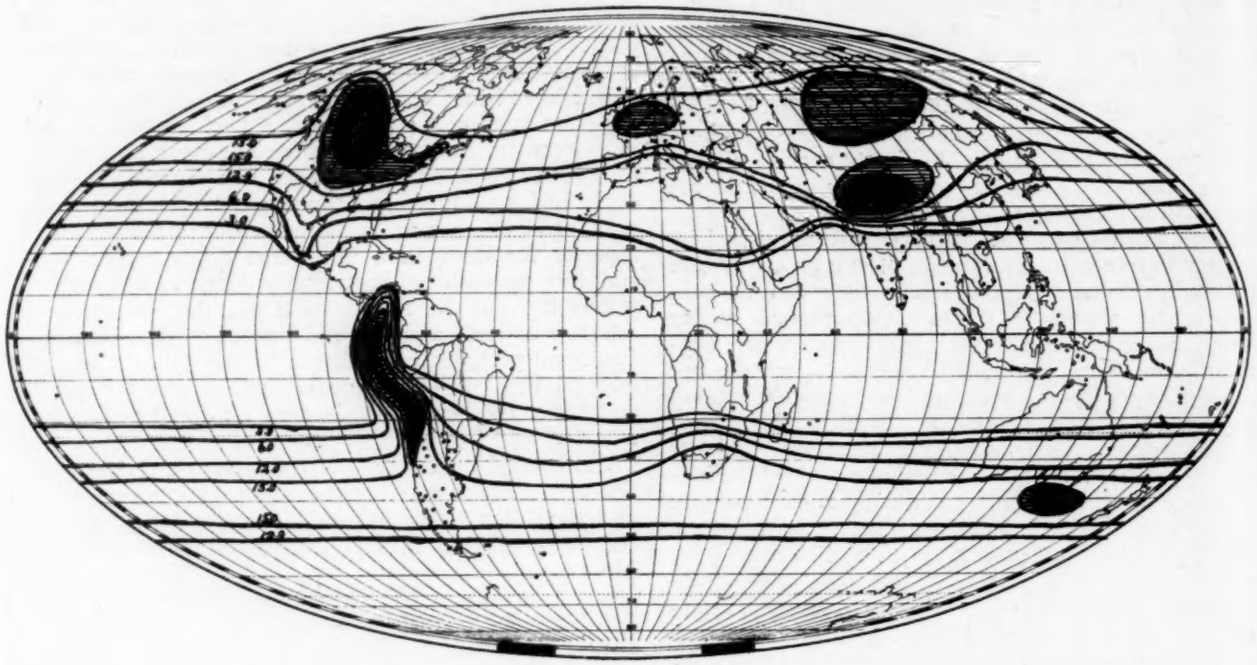

Fig. 1.—Climatic stimulation over the earth.

As pointed out recently,[6] man relies on meats and other animal products for the greater part of his B vitamin supply. Nuts are also a rich source but are eaten in much lesser quantities, while the vitamin in legumes is largely destroyed by cooking processes. Of the vitamin rich cereals the only two in common use (rice and wheat) are robbed of their supply by milling methods. Meats thus assume a very important dietary role quite aside from their protein content. It is unfortunate that tropically grown meats and eggs have been found deficient in these essential vitamin catalysts.[7] Residents of warm climates thus face a double handicap: they need a higher B vitamin intake but instead find their native animal products deficient in these elements. Hence they are depressed both by their difficulty in heat loss and by a widespread vitamin deficiency. In cooler climates the meats are richer in vitamin and the human need is less for each pound of food.

5. Mills, C. A.: Medical Climatology, Springfield, Illinois, Charles C Thomas, 1939.

6. Waisman, Harry A., and Elvehjem, C. A.: The Vitamin Content of Meat, Minneapolis, Burgess Publishing Company, 1941.

7. Mills, C. A.: The Influence of Climate and Geography on Health, Bull. New York Acad. Med. **17**: 922-933 (Dec.) 1941.

Man's higher requirement for the vitamin B fractions in tropical warmth, coupled with a poorer dietary supply, probably plays an important part in the widespread occurrence there of such deficiency states as beriberi and pellagra. The subject needs a thorough investigation, for on this situation may hinge a considerable part of the malnutrition and low physical level seen among tropical populations. The magnitude of the problem can be appreciated only when it is remembered that half the earth's human population lives under just such depressive heat as is being discussed here. We can as yet only guess at the many bearings this variation in vitamin requirement at different temperature levels may have in the problems of human welfare. Since it directly affects cellular combustion and the source of energy for all body functions, it must of necessity have important bearings on all the vital processes and functions of the body. A whole new field seems to be opened up by this dynamic view of physiologic response to climate.

CLIMATE AND DISEASE

The preceding discussion of climatic physiology provides a most useful background for an understanding of the geography of many diseases. Tropical people, with their more sluggish combustion rate and lowered vitality, die largely from infectious diseases; energetic residents of cooler lands die from the breakdown and degenerative diseases. Only with pneumococcic and streptococcic infections, mainly respiratory or of the nasopharynx, is the attack frequency higher in temperate regions and then only during the seasons of great cyclonic storminess. Since these disease differences are based largely on demonstrable differences in physiologic response to living environment and are susceptible of a considerable degree of control, it seems wise that the medical profession consider them against their proper physiologic background.

It is not at all surprising that clearest climatic relationships should be found for the diseases of metabolic overstimulation or breakdown. Metabolic stress rises highest in middle temperate regions where most nearly optimal heat loss conditions prevail, while toward tropical warmth evidences of such stress progressively decrease. Diabetes, with its breakdown in ability to prepare dextrose for the cellular combustion on which all bodily energy depends, shows this climatic relationship perhaps most clearly; but the relationship is also quite evident for pernicious anemia with its exhaustion in the production of red cells to carry the oxygen from lungs to tissues. Toxic goiter and hyperthyroidism seem involved in this same environmental influence.

Perhaps most worrisome to the medical profession of stimulating regions are the growing evidences of stress and failure in the vascular system. On this system falls the most direct load as tissue combustion increases, for it must transport to the tissues all the needed combustion factors. The advance of sudden heart failure toward ever earlier ages in American men of middle temperate latitudes is presenting an acute health problem. Over two thirds of American physicians dying in 1939 did so from primary failure of one sort or another in the circulatory system. Addison's disease with its adrenal failure and other exhaustion states such as myasthenia gravis and neurocirculatory asthenia also most frequently occur in middle temperature latitudes. And for some reason it is in these latitudes that cancer is presenting its greatest menace to man. Leukemia, which some consider a form of neoplasia, is almost exclusively a cool climate disease.

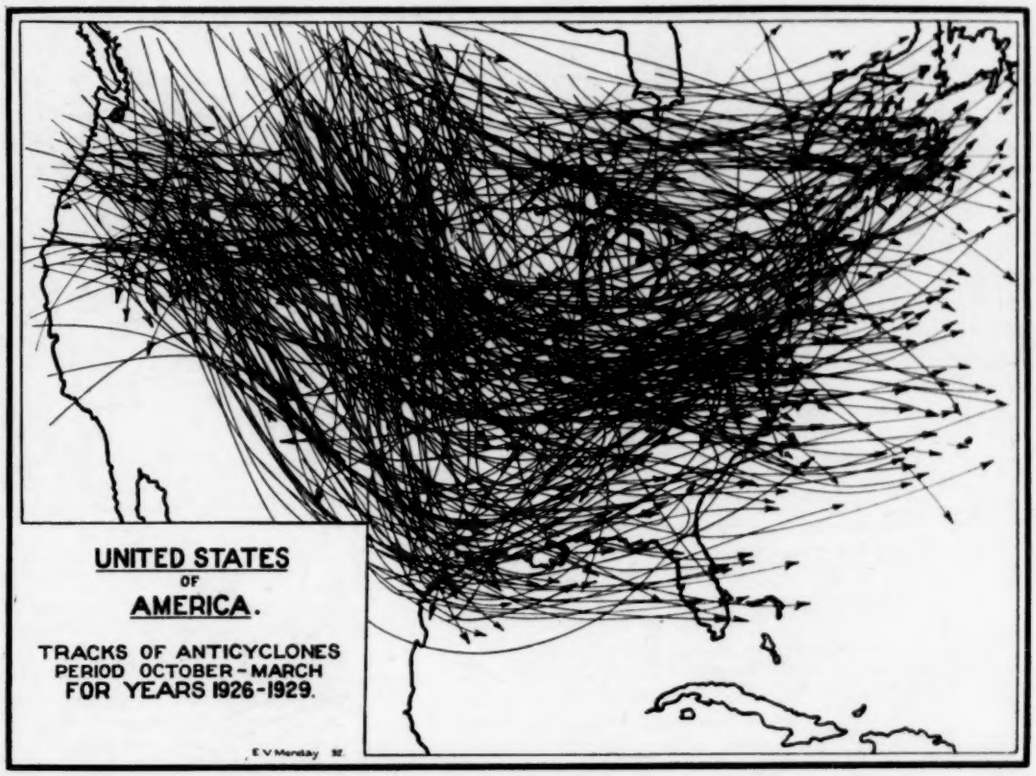

Fig. 2.—Storm tracks over the United States: winter highs, 1926-1929.

Infectious diseases present the other side of the picture, for with them greatest frequency and highest death rates go hand in hand with lowered tissue resistance in the debilitating warmth of tropical and subtropical regions. Temperatures there are more nearly optimal for parasitic and bacterial contamination of water and food supply, it is true, and added to this is the tremendous problem of insect vectors; but working beneath these major health threats in the tropics is the lowered general tissue vitality from sluggish cellular combustion. Figure 1, showing regional differences in the intensity of climatic stimulation over the earth, is presented here so that the reader may have before him this rough idea of the metabolic driving force exerted on man in the different regions. The methods used in calculating the indexes of climatic stimulation have been described in detail elsewhere.[5]

Cyclonic storminess, with the atmospheric changes which accompany passage of successive "highs" and "lows" over a given region, seems in some manner related to the initiation of infectious disease attacks. Respiratory and rheumatic infections are most closely involved in this type of climatic effect, but it also influences such other infectious attacks as acute appendicitis and puerperal septicemia.

Respiratory infections are associated with winter cold and storminess in north temperate latitudes to a striking degree. Life hazards of all sorts reach a peak at this season, for to the infectious dangers of the more violent storminess is added the greater stress of an increased metabolic load. In the southern hemisphere winter brings much less of an increase in life's hazards, for there storminess is least during midwinter cold. The increase in mortality from respiratory infections in the United States, from summer low to midwinter high, is almost three times as great as it is in similar latitudes of Australia. And in the United States unusually stormy winters are accompanied by much greater frequency of respiratory illness and death than are those of lesser atmospheric turbulence. Hospital admissions for acute rheumatic fever at Cincinnati show a similar parallelism with seasonal changes in storminess.

This relationship of storminess to infections is just as evident on a regional as on a seasonal basis. Acute respiratory infections and acute rheumatic fever are predominantly diseases of stormy regions, being worst in the middle temperate belt of cyclonic storms and least troublesome in calm tropical warmth. Respiratory disease in the tropics becomes a real problem only in those regions afflicted with cyclonic storms of the typhoon or hurricane type. Such regions include most of the Philippine Islands and the eastern Asiatic coast up to Japan, those parts of India around the bay of Bengal, most of the West Indies and nearby eastern seaboard of North America and to a lesser degree the southwestern coastal region of Mexico. Low pressure storm centers passing over these regions seem to bring much the same respiratory disease problems as are faced by people living in the temperate zone storm belts. They do not have the body chilling from sudden temperature change, such as afflicts people of stormy temperate regions, but the pressure changes alone seem capable of initiating the infectious attacks. Careful physiologic studies are badly needed in this field of pressure change effects, particularly as regards disturbances in tissue water balance. Present knowledge is extremely sketchy and inadequate.

In order to give a general appreciation of the storm problem over North America, there is shown in figures 2 and 3 the course followed by anticyclonic high pressure centers affecting the United States during the four year period 1926-1929. Each such major "high" center affects an area 1,500 to 2,000 miles in diameter as it sweeps across the continent. From these figures one may get some idea of the relative differences in storm effects man faces in different parts of the continent during the winter, and the total reduction in storminess which comes with summer warmth. In the summer, storm centers cross the continent less frequently, travel more slowly and are accompanied by less abrupt and less extensive atmospheric changes. At no time of the year do major storm centers cross the southwestern part of the United States or the highland regions of Mexico. This nonstormy zone expands northeastward during summer warmth, and at this season people of the Old South are left with the stagnant, moist heat typical of tropical regions.

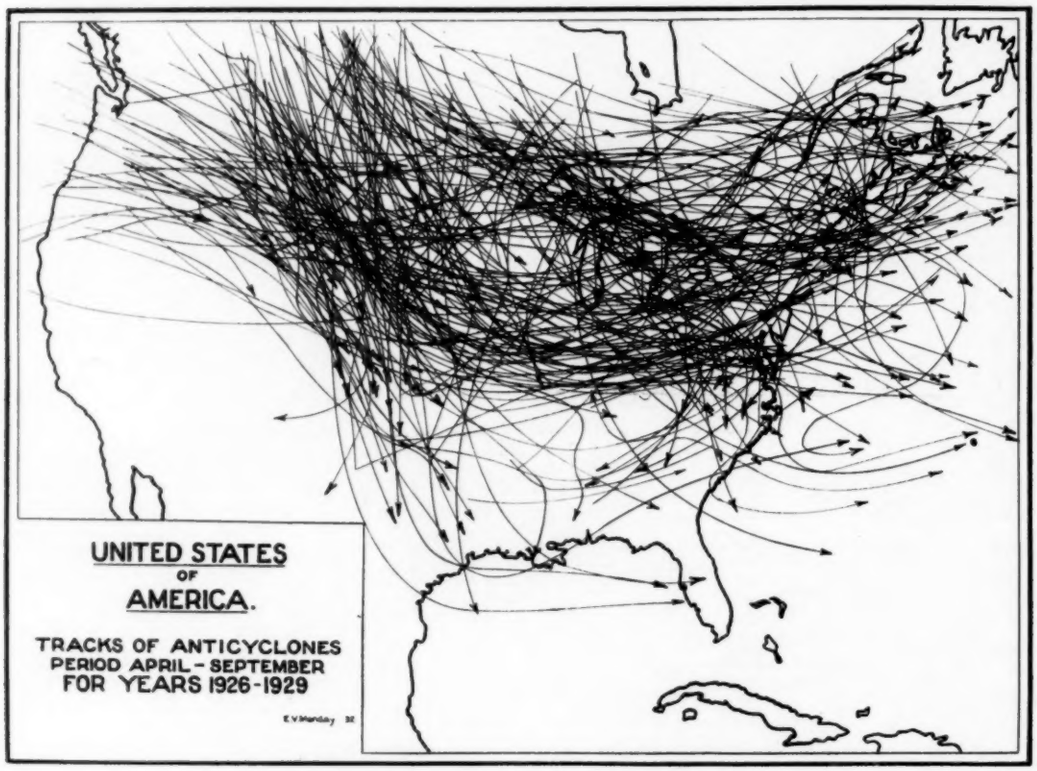

Fig. 3.—Storm tracks over the United States: summer highs, 1926-1929.

These two storm maps deserve considerable study, for from them can be obtained much of the storm health story. It is in the stormy winter season and in the stormy regions of the earth that respiratory and rheumatic infections most severely afflict mankind.

CONCLUSION

Plans for spa therapy should not be made without due consideration of possible climatic and weather effects in the region to be chosen. Spas of the nonstormy Southwest are to be preferred for patients with respiratory or rheumatic complaints, while victims of the metabolic or degenerative diseases will usually benefit more in the calming warmth of the Gulf coast. For low vitality patients of tropical or subtropical areas,

a summer sojourn in northern coolness works wonders; however, they should beware of the cold and storms of northern winters. Each patient constitutes a separate problem in his relation to climatic environment; hence final decision must be made by the physician in charge. In reaching that decision the physician should be guided by the general principles of climatic and weather effects here set forth.

The therapeutic duties of a physician can no longer be concerned simply with the specific treatment of the disease at hand. He should look further afield for the larger forces affecting his patient's welfare and future health. And, among the outside forces bearing on these more general aspects of existence, climatic and weather influences are of great importance. The most perfect diet cannot lead to physical vigor and high vitality unless the heat generated in its use can be readily dissipated from the body. The physician of the future will therefore need to develop more deeply his interest in, and knowledge of, climatic and meteorologic influences affecting man throughout his existence in the different regions of the earth.

5046 Oberlin Boulevard.

Council on Industrial Health

THE COUNCIL ON INDUSTRIAL HEALTH HAS APPROVED THIS ARTICLE AS THE SEVENTH IN A SERIES ON MEDICAL SERVICE IN INDUSTRY.

C. M. PETERSON, M.D., Secretary.

INDUSTRIAL PHYSICAL EXAMINATIONS

PURPOSE

The purpose of industrial health programs is to promote and maintain the physical and mental welfare of all industrial employees. Physical examinations in industry are a means to this end.

Specifically, the objectives of industrial physical examinations are:

1. To facilitate placement and advancement of workers in accordance with individual physical and mental fitness.
2. To acquaint the examinee with his physical status and to assist him in improving and maintaining personal good health.
3. To safeguard the health and safety of others.
4. To discover and control the effects of unhealthful exposure.
5. To promote cooperative support and understanding of industrial health practices by employer and employee alike.

Unjust or questionable exclusion from work through improper application of the findings on physical examination in industry is against the public welfare and contrary to sound industrial health principles.

SCOPE

Industrial physical examinations should include:

1. Past medical, family and occupational history.
2. Physical findings.
3. Personality appraisal.
4. Laboratory data.
5. Summary and recommendations.

GENERAL PROCEDURES

Since placement of the worker in suitable employment is an important objective of industrial physical examinations, the examiner will obtain best results only when he is familiar with the industry he serves. Medical inspection of the plant or industrial premises at regular intervals is essential to an adequate physical examination program as well as in other aspects of industrial hygiene.

Physical examinations in industry are classified under two major headings:

1. Preplacement examinations of applicants for employment.
2. Periodic reexaminations (regular or special).

In either case the examination should be complete.

The examination should be conducted by the physician himself, except such routine procedure as can safely be assigned to trained assistants. The examinee should remove all clothing in a private room. Special arrangements and a nurse in attendance are necessary in examining women employees.

EQUIPMENT

Physical examinations will be facilitated if the following equipment is available:

Examining table	Dynamometer
Stools, chairs and couch	Centrifuge
Mirror	Microscope
Screen	Stethoscope
Scale and measuring rod	Ophthalmoscope
Metal measuring tape	Blood vacuum tubes
Spotlight	Otoscope
Distant and near reading cards	Reflex hammer
Color sense testing cards	Rubber gloves and finger cots
Nose and throat mirror	Tuning forks
Transilluminator	Hemoglobin outfit
Blood pressure instrument	Urinalysis equipment
Luer syringes (2 cc. and 10 cc.)	Garment racks
Thermometer	

RECORDS

Content.—No single form has been devised to suit all requirements. The accompanying example is a composite of many used successfully in industry. Regardless of form, the records should contain:

1. Identification data: name, address, date and place of birth, race, sex, marital status, clock or social security number, and in certain circumstances photograph and finger prints. Some industrial physicians include name and address of next of kin.

2. Past medical and occupational history. Although details may be elicited by assistants, the importance of significant past health experience should be evaluated by the physician himself.

3. Physical findings:

(*a*) Preplacement examination. The attached form is designed for preplacement physical examination. Clarity and uniformity of expression are desirable. Variation in procedure will depend on specific industrial exposures and special job requirements. Examinations for transfer to other work or on return to work after prolonged absences are essentially preplacement in character.

(*b*) Periodic examination. Reexamination should be conducted in the same detail as the original preplacement examination survey. The recommended form can be readily modified to allow for reexamination and to meet special requirements. General principles are fully described in "Periodic Health Examination—A Manual for Physicians," Chicago, American Medical Association, 1940. Repetition of physical examinations must be determined by the physician in charge, based on his original examination and the nature of the industrial environment.

4. Personality data. Observation of temperament, personality and significant nervous or mental manifestations should be a correlated part of a complete examination. The brief outline suggested in the form has been used in practice with good results. Comparative schooling refers to the level of education attained in comparison with other children in the family.

5. Laboratory data. Urinalysis, hemoglobin determination, blood test for syphilis, chest x-ray examination, differential blood smear and blood sedimentation rate are employed in industry in about that descending order of frequency.

6. Summary and recommendations.

Coding.—Usage varies in coding or rating physical and mental status, but the common intent is to classify examinees in one of the following groups:

A. General approval for all work.
B. Approval for placement under medical supervision.
   1. With limited physical exertion.
   2. In nonhazardous work.
   3. With orthopedic defect.
   4. With defective vision
   5. With defective hearing.
   6. With neuromental handicap.
C. General disapproval for any work.

From the public and industrial health standpoint the only absolute bar to immediate employment in ordinary occupations

should be communicable disease, psychosis or serious disabling injury or disease. Other considerations related to employer liability, workmen's compensation, factory acts and health codes must be determined separately for each jurisdiction.

Preservation and Use.—The examining physician may properly put information derived from records of industrial physical examination to the following uses:

1. All major findings should be discussed with the employee, with emphasis on the importance of obtaining immediate and adequate medical care.

2. A transcript may be supplied to the employee's personal physician or to other official community health agencies on consent of the employee.

INDUSTRIAL PHYSICAL EXAMINATION

Employer City State
Name Address Clock No.
Age Race Marital Status Sex Social Sec. No.
Personal Physician Next of Kin

Personal and Family History:

Immunization Record:

Occupational History:

Physical Examination: Date Examiner
Height Weight Chest Measurement {Inspiration / Expiration
Temperature Pulse {Resting / After Exercise Girth
Blood Pressure Posture Musculature Nutrition
Skin Glands Hair Scalp
Vision: Distant {R. / L. Corrected {R. / L.
Vision: Near {R. / L. Corrected {R. / L.
Vision: Color Sense Depth Perception Eyegrounds
Hearing {R. / L. Nose-Throat Tongue
Tonsils Neck
Teeth Gums
Lungs {R. / L.
Heart
Abdomen Hernia
Genitalia Rectum Prostate
Spine
Joints Reflexes Hands Feet
Dysmenorrhea

Laboratory Data: Date Examiner
Urine: Appearance Specific Gravity Albumin Sugar Sediment
Blood: Hemoglobin Smear Sedimentation Rate
Wassermann Kahn Kline
X-Ray: Chest Other

Personality Data:
Appearance {Neat / Careless / Slovenly Temperament {Aggressive / Quiet / Cooperative / Noncooperative Intelligence {Quick / Average / Dull
Comparative Schooling {Advanced / Average / Retarded Summary {High / Medium / Low

Summary and Recommendations: Code

3. The employer should be given information in accordance with the suggested code described in this report to facilitate placement or promotion. A special simple form can be devised for this purpose. The employer should especially be notified of any condition or disability thought to be caused by faulty work environment.

4. Governmental agencies such as courts, workmen's compensation commissions or health authorities should be supplied with information on legally enforceable official order.

In all other respects the confidential character of physical examination records should be rigidly observed and access should be granted only on request or consent of the examinee, preferably after preliminary discussion with the examining physician.

Suitable filing equipment and training of personnel should be maintained for the safe keeping of all medical records in the medical department.

PERSONNEL

Physical examination is an important service of an industrial medical department having regular medical staff supervision. Where considerable numbers of examinations occur, nurses, technicians and clerks are helpful in securing and recording data in routine procedure. They require training which should be accepted as a special responsibility of the medical director.

In small plants, employers customarily make arrangements with individual examiners. A modification of this practice is to secure the services of an examiner from a panel of physicians approved by the county medical society for services of this kind.

THE JOINT COMMITTEE ON INDUSTRIAL OPHTHALMOLOGY REPRESENTING THE SECTION ON OPHTHALMOLOGY OF THE AMERICAN MEDICAL ASSOCIATION AND THE AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY HAS SUBMITTED THE FOLLOWING REPORT TO THE COUNCIL ON INDUSTRIAL HEALTH FOR PUBLICATION.

C. M. PETERSON, M.D., Secretary.

THE KEYSTONE TELEBINOCULAR IN INDUSTRY

The Joint Committee on Industrial Ophthalmology has participated in careful analysis of visual records made in industry employing the Keystone Telebinocular. These records have been correlated statistically with subsequent job performance, incidence of accidents and with conventional professional aptitude tests. Evidence at present permits the following appraisal of the industrial use of the Telebinocular:

1. The Telebinocular is a sturdy, well made instrument, originally designed as a hand stereoscope. In 1933 it was modified by attaching a special shaft and slide holder, mounted on a stand. The slides are modifications of the original Ready to Read Tests designed by E. A. Betts to measure the visual performance of school children.

2. The record forms designed to classify employees for jobs in accordance with visual ability are based on arbitrary standards not justified by actual experiment on thousands of industrial employees. A simplified form has been developed by a member of the Joint Committee which has proved to be more practical. The Keystone View Company is also working on a simplified record form.

3. The Telebinocular visual acuity tests at distance have, through the work of the Joint Committee, been correlated with Snellen equivalents.

4. The depth perception test, while not accurately graduated, can be used to advantage in screening out examinees in the lowest quarter of performance who are under consideration for special or dangerous assignments.

5. The phoria tests will identify most examinees with muscle imbalance lying outside the general range of normality. These measurements cannot be expressed in prism diopter equivalents.

6. The telebinocular has no adequate near point test of acuity in its series. Because of the importance of near point acuity in many jobs, special provisions will need to be made.

7. The color vision test, while inadequate as a whole, is useful in identifying certain types of color deficiency.

8. Several of the tests show little or no relationship to success on the job or with standard clinical practice in ophthalmology and are likely to create an impression of significant visual deficiency. Actually, the tests detect what might better be called substandard visual function.

The Joint Committee believes that the Telebinocular, used wisely by a properly trained tester, will uncover subnormal visual performance not detected by the common industrial practice of testing for central visual acuity alone. However, the tests employed for determining muscle balance, stereopsis and color sense have definite limitations. The existing standards for acceptance or rejection of examinees in industry or for the visual classification of employees are not accurate enough for dependable use. Instead, individual standards should be created in each industry based on available data and the practical experience of associated medical and ophthalmologic staffs.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT. HOWARD A. CARTER, Secretary.

SIMPLE METHODS FOR PERFORMING ARTIFICIAL RESPIRATION

RALPH M. WATERS, M.D.
MADISON, WIS.

Artificial means to replace the act of breathing need not be complicated or difficult.[1] Any intelligent person, even a child, may be taught to perform artificial respiration which is adequate and safe.

In his teaching at Padua four hundred years ago Vesalius [2] emphasized the importance of proper respect for the thoughts of the ancients—an excellent attitude of mind for modern people. He demonstrated the adequacy of simple intermittent inflation of the lungs with air as a substitute for normal breathing. Goodwyn [3] was the first physician to apply the knowledge of the exchange of oxygen and carbon dioxide during respiration. He called attention to the advantage of adding oxygen to the atmosphere used during artificial respiration. In the intelligent employment of these two contributions is embraced the beginning and the end of "artificial respiration." There is no more to it than that. And yet in the century and a half since Goodwyn's book was published much paper has been used in describing how and with what mixtures of gases ventilation of the lungs ought to be accomplished.

Children are thought to like mechanical gadgets; nevertheless, how frequently do we find father playing with the electric train weeks after Junior has found other interests. Enthusiasm for the clever construction and intricacy of a mechanical respirator is more likely to determine its purchase and use, even by a physician, than is thoughtful reasoning or experiment as to its physiologic effects, its simplicity, repairability and all round availability. It is not my present purpose to discuss the relative merits of the numerous manual maneuvers suggested for the performance of artificial respiration, nor do I intend to compare the advantages of the many mechanical gadgets manufactured for the purpose. It is desired only to emphasize four facts: (1) that, as Vesalius demonstrated, gentle intermittent inflation of the lungs with air can serve as an adequate substitute for normal breathing; (2) that, if oxygen is available, it is desirable, as Goodwyn suggested, to add this gas to the atmosphere used; (3) that, regardless of the method employed, atmosphere cannot enter and leave the lungs if the air passages are obstructed, and (4) that elaborate equipment is not essential. If these four points are properly appreciated, any one can perform artificial respiration. It ought to be begun as soon as natural breathing stops by whoever is present at the time. Blowing into the subject's nose or mouth is the method which is always available. Manual maneuvers (Silvester, Schafer) can also be quickly applied. If apparatus is used, the simpler it is the better.

Anesthetists find it essential to be prepared to do artificial respiration at a second's notice. Overdose of an anesthetic or depressant drug, as well as various other accidents, sometimes stops normal breathing of the patient during an operation. The equipment described here is constituted of materials similar to those constantly used by many anesthetists to contain the anesthetic atmospheres breathed by their patients. They are therefore always in the hand of the anesthetist when an accident happens. In fact, when the anesthetist is alert, cessation of breathing is rarely dangerous. The method of artificial respiration described in the following paragraphs has been used to "breathe" efficiently for the patient over long periods of time. It is even employed during some surgical operations to hold in abeyance for hours the normal movements of the respiratory muscles when such movements may interfere with delicate surgical procedures. Such experience constitutes evidence that serious harm from such artificial respiration need not result. Simple apparatus, similar to that used by the anesthetists, costs little, is light and easily transported and can be employed by any intelligent person to perform artificial respiration. No elaborate and expensive machine will do a better job of artificial respiration.

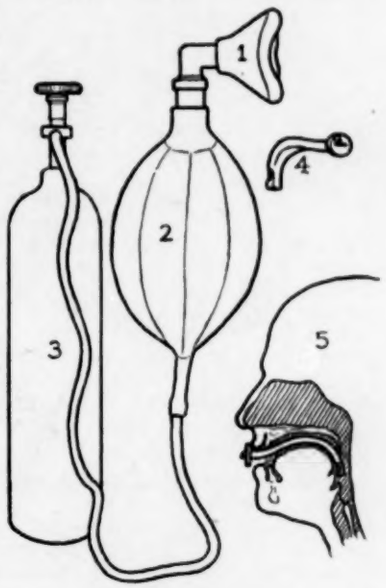

Fig. 1.—A mask (1) to cover the mouth and nose, and a sturdy rubber bag (2) connected to an oxygen cylinder (3) constitutes adequate equipment. A properly shaped pharyngeal airway (4) of metal or hard rubber when placed over the tongue into the throat (5) sometimes helps to maintain a free passage to the windpipe.

EQUIPMENT AND PROCEDURE

Any manufacturer of anesthetist's equipment can furnish a face mask with a 5 or 6 liter breathing bag of strong rubber connected to a rubber tube several feet long. A yoke to fit a small oxygen cylinder and a wrench with which to open the cylinder complete the assembly (fig. 1). The operator holds the mask tightly over the nose and mouth and fills the bag with oxygen (fig. 2 *A*). If oxygen is not available, the operator may hold the rubber tube in his mouth and keep the bag partly filled by blowing into it. Compression of the bag with the hand (fig. 2 *B*) forces atmosphere into the lungs (provided the mask is in approximately airtight contact with the face and the upper air passages are not obstructed). Release of pressure allows the atmosphere to return from the lungs. Such intermittent inflation of the lungs alternating with pauses to allow for deflation accomplishes adequate ventilation. The bag will need to be refilled frequently enough to replace the atmosphere which unavoidably leaks from under the mask during inflation. The frequency of inflation is relatively unimportant provided a pause after each

1. It is well recognized that the various manual maneuvers (Schafer, Silvester and their modifications) to accomplish artificial respiration are capable of accomplishing adequate ventilation of the lungs when the air passages are not obstructed. The impression is gaining prevalence that, when apparatus is used, it must be costly and elaborate. This paper emphasizes the long recognized fact that very simple mechanical devices are satisfactory. No originality is claimed for the method described nor is it claimed to accomplish more efficient or safer pulmonary ventilation than the manual maneuvers.

2. Vesalius, Andreas: De humani corporis fabrica, Basel, J. Oporini, 1543.

3. Goodwyn, Edmund: The Connection of Life with Respiration, London, J. Johnson, 1788.

compression of the bag is sufficient to allow the chest wall to sink back to its passive condition and the lungs to collapse partially and force the inflated atmosphere out.[4]

Artificial respiration should resemble normal breathing. The operator ought to estimate how frequently and how vigorously this subject, save for the accident, would breathe for himself. Such activity should be imitated as exactly as possible both in depth and in rate. As pressure is made on the bag, the thorax of the subject must be watched to see when it begins to expand. If beginning movement of the chest can be seen or felt, enough pressure has been exerted and the bag should be released. The operator must be sure that the outflow of atmosphere from the lungs is not impeded by the weight of the hand against the bag.

Free Exchange Essential.—If for some reason passage to the windpipe is not open, atmosphere may fail to reach the lungs or it may be forced down the gullet

Fig. 2.—The bag is filled with oxygen (A) and squeezed by the hand (B) to force atmosphere through the upper air passages and windpipe into the lungs. As soon as movement of the chest is seen, indicating that the lungs are filling, the operator's hand releases the bag completely to allow the lungs to empty. Normal rates of breathing are 12 to 20 per minute. Try to imitate nature in both rate and depth.

into the stomach. To assure a free passage to the trachea and avoid blowing up the stomach or forcing vomited fluids, food or other foreign substances into the windpipe, three procedures may be useful:

1. Empty the mouth, nose and throat of any liquid (water in drowning; vomitus) or solid substance (food, tobacco, chewing gum, loose teeth). This can be done with the fingers, with a cloth sponge or, better, by gravity. Place the patient on his stomach, face down and head lowered if possible (fig. 3). A child can be "stood on his head." Hospitals are equipped with devices for sucking material from the throat.

2. The relaxed and swollen tongue may fall backward to sit on the opening to the windpipe. In the face down position, gravity tends to keep the tongue away from the opening. In addition, the operator may pull the tongue forward: (*a*) By pushing the jaw

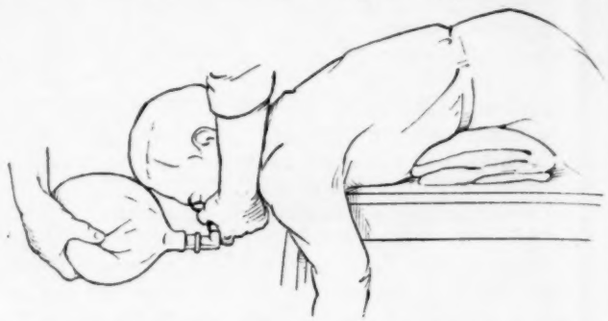

Fig. 3.—When intermittent inflation of the lungs is done with the subject's face down, the head low and a pad under the "stomach," water and other fluids may drain from the lungs and throat.

forward with pressure behind the angles of the jaw. (*b*) By grasping the tongue with a cloth (fig. 4). (To hold the tongue forward while a mask covers the face, a large safety pin may be passed through the midline of the tongue, a half inch from the tip. Persons needing prolonged artificial respiration are unconscious and the slight injury to the tongue caused by the pin results in little soreness afterward.) (*c*) By placing a rubber or metal artificial airway if available (5, fig. 1).

3. To prevent inflation of the stomach, the hand or a moderate weight may be placed over the upper part of the abdomen if the victim lies on his back, or a soft roll of cloth may be under his stomach when his face is down (fig. 3).

ALTERNATIVE PROCEDURE

Intermittent Direct Inflation of Lungs by the Operator.—If the apparatus just described is not immediately available, valuable time must not be lost. Lives

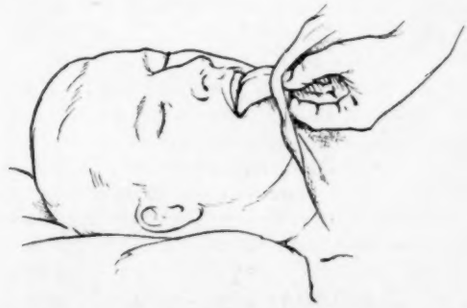

Fig. 4.—With your handkerchief the tongue may be pulled forward before gently passing an artificial airway over it (see 5, fig. 1).

are sacrificed by neglecting the first thirty seconds after breathing stops. Direct inflation of the lungs is always at hand (fig. 5). Either the nose or the mouth may be blown into while one hand of the rescuer holds the other portal closed. The other hand, resting on the subject's chest, perceives the point at which the chest moves; in other words, when the lungs are sufficiently inflated. If no movement takes place, obstruction is present and the air passages must be cleared by the various maneuvers described.

4. If the mask is held in really airtight contact with the face for several minutes, too much carbon dioxide—produced by the patient—may accumulate in the bag. Usually the necessary addition of oxygen or air to replace that which leaks between the mask and the skin of the face during the pressure of each inflation serves to remove carbon dioxide. Even if leakless contact is maintained, artificial respiration for less than five minutes will not permit a harmful accumulation of carbon dioxide. If long periods of artificial respiration are maintained with this equipment, frequent emptying and refilling of the bag is necessary. This is particularly important if breathing has stopped as the result of poisoning with volatile or gaseous substances such as ether or carbon monoxide.

COMMENT

Natural breathing is a very delicately adjusted mechanism for causing the atmosphere to enter and leave the lungs. The frequency of exchange and the depth of each breath are attuned to the needs of the blood and tissues for oxygen. The amount of air which enters and leaves the lungs each minute therefore varies widely for each individual and for the same individual at different times. Artificial respiration will therefore rarely exactly simulate normal breathing. The life processes of the individual who has ceased to breathe are at a low ebb and hence his demand for oxygen is comparatively little. When the air passages to the lungs are not obstructed, efforts at artificial breathing are apt to be overdone rather than underdone. If obstruction is present the opposite is true. Thoughtful and deliberate attention to the movements of the chest resulting from one's efforts will succeed while hasty and thoughtless activity may fail. Remember the object of normal breathing—to ventilate the lungs with air or oxygen which flows gently and slowly back and forth through the windpipe to and from the air sacs. Try to imitate normal breathing for each particular subject.

Fig. 5.—With his left hand the operator holds the subject's nose closed while he blows into the mouth intermittently. A handkerchief or other light material prevents contamination. The operator's right hand rests lightly on the chest in order that he may appreciate when air is entering the lungs.

SUMMARY

If a reasonably robust person ceases to breathe, adequate artificial respiration may sustain life until breathing is reestablished. Only disappointment can result from performing artificial respiration on persons who cease to breathe as a terminal event in the course of disease. Methods are most useful which are instantly available and simple.

1. When breathing has stopped, do not concern yourself with calling for help, moving the patient, wrapping him in blankets or any maneuver other than keeping up intermittent rhythmic exchange of the atmosphere in his lungs.

2. Utilize inflation of the victim's lungs from the lungs of the operator, or exchange by manual maneuver, if apparatus is not at hand.

3. If and when a mask, rubber bag and a cylinder of compressed oxygen are available, fill the bag with oxygen and inflate the lungs by pressing on the bag.

4. In either case (2 or 3) use only sufficient pressure to expand the chest slightly. If one can see or feel the chest begin to expand as one blows or presses on the bag, enough pressure is being used. The amount of pressure necessary may be great if the air passages are partially obstructed. Try to relieve such obstruction as soon as possible.

5. Allow adequate time for the lungs to empty before inflating them again.

6. Persist until the subject breathes for himself or until a physician has pronounced him dead.

7. If water or other substances are thought to be in the mouth, throat, and air passages, work with the patient in the face-down position with the head low if possible.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

AUSTIN E. SMITH, M.D., Secretary.

CONCENTRATED OLEOVITAMIN A AND D.—"Fish liver oil, or fish liver oil diluted with an edible vegetable oil, or a solution of vitamin A and D concentrates in fish liver oil or in an edible vegetable oil. The vitamin A shall be obtained from natural (animal) sources and the vitamin D may be obtained from natural (animal) sources or may be synthetic oleovitamin D. Concentrated Oleovitamin A and D contains in each gram not less than 50,000 and not more than 65,000 U. S. P. units of vitamin A, and not less than 10,000 and not more than 13,000 U. S. P. units of vitamin D." *U. S. P.*

For description and standards see the U. S. Pharmacopeia under Oleovitamina A et D Concentrata.

Actions, Uses and Dosage.—See under Vitamin A and D preparations (N. N. R., 1943, p. 605).

WALKER VITAMIN PRODUCTS, INC., MOUNT VERNON, N. Y.

Concentrated Oleo Vitamin A-D Drops: Each gram contains not less than 62,500 U. S. P. units of vitamin A and not less than 10,000 U. S. P. units of vitamin D. Natural esters of vitamin A (distilled from fish liver and vegetable oils) plus activated ergosterol in refined corn oil. Flavored with cinnamon.

DEHYDROCHOLIC ACID (See New and Nonofficial Remedies, 1943, p. 322).

The following dosage form has been accepted:

GEORGE A. BREON & COMPANY, INC., KANSAS CITY, MO.

Tablets Dehydrocholic Acid: 0.25 Gm.

SODIUM CITRATE (See New and Nonofficial Remedies, 1943, p. 458).

The following dosage forms have been accepted:

BAXTER LABORATORIES, INC., GLENVIEW, ILL.

Sodium Citrate 4% W/V in Distilled Water: 25 cc. and 50 cc. in Centri-Vac containers. A sterile 4 per cent solution of sodium citrate in distilled water.

Sodium Citrate 4% W/V in Distilled Water: 50 cc. in Transfuso-Vac containers. A sterile 4 per cent solution of sodium citrate in distilled water.

TRYPARSAMIDE (See New and Nonofficial Remedies, 1943, p. 212).

The following dosage forms have been accepted:

MERCK & CO., INC., NEW YORK

Ampuls Tryparsamide: 1 Gm., 2 Gm. and 3 Gm.

LIVER INJECTION (See New and Nonofficial Remedies, 1943, p. 392).

The following dosage form has been accepted:

THE WARREN-TEED PRODUCTS CO., COLUMBUS, OHIO

Liver Injection, 10 U. S. P. Units per Cc.: 10 cc. vials. Preserved with 0.5 per cent phenol.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, OCTOBER 30, 1943

NURSING SERVICE IN WARTIME

Nursing service "as usual" is gone for the emergency. The armed forces have a priority on nurses. The remaining nurses must be utilized for all nonmilitary governmental agencies and essential civilian nursing services. The private duty nurses available in the country constitute a small group and there are numerous calls upon them for a wide variety of services. "Luxury" nursing is certainly out for the duration. The nursing section of the Procurement and Assignment Service for Physicians, Dentists, Veterinarians, Sanitary Engineers and Nurses urges that private duty nurses not eligible for military service should be utilized for the care of acutely ill patients, first, in hospitals and, second, in homes. Every nurse should be used on the highest level of skill of which she is capable. A private duty nurse shoud be assigned to the care of a single patient only when it is impossible to arrange for adequate care by using a part of the service of a nurse who is attending also to other patients. In homes private duty nurses should be employed only when it is impossible to provide enough care through such facilities as are offered by the visiting nurse associations and the hourly nursing services. Another important civilian need is the work of private duty nurses in positions on the staffs of hospitals. Also there are such places as those associated with public health nursing agencies, industry and physicians' offices.

The superintendents of hospitals might give further serious consideration to their utilization of personnel. The tendency should be to utilization of nurses almost wholly by assignment to large groups of patients. The nurse's duties should be evaluated so that the major portion of her time is used in actual nursing care rather than in the serving of meals or in other duties which may be performed by nurses' aides or any of the other auxiliary services that have been developed. In some hospitals already the practice is developing to assign a nurse to the care of a single patient only on the recommendation of the physician in cooperation with the superintendent of nurses and the superintendent of the hospital.

The work of nurses in industry is of increasing significance. The Procurement and Assignment Service has established criteria of essentiality for nurses in industry. Such nurses will not for the present be urged into military service. A nurse who is an industrial nursing consultant, or a state or city health department or a labor department nurse, a supervisor, a staff nurse who is working full time at professional nursing duties or a nurse who is the only full time nurse in an industry, will be considered for the present essential. However, nurses in industry will be expected to limit their activities to professional nursing duties connected with the medical department of the industry with which they are associated. Industries will be urged to utilize existing community services for nursing care if those resources are adequate to meet the needs. Furthermore, industry is urged to avail itself of nonprofessional technical aides whenever possible.

On the medical profession particularly rests the special obligation to utilize the services of nurses in the doctor's office only when absolutely necessary. In each community a local committee of nurses has been established which is to advise in determining offices that need professional nursing services. Physicians who employ a nurse without actual need are requested to release such nurses for use in essential nursing service and to employ other personnel instead. It is realized that the practices of physicians remaining in civilian service have in many instances increased so greatly that there is more need now for efficient office nurses than previously. Even under such circumstances, however, the employment of a nurse not eligible for military service may release an eligible nurse for the armed forces.

Since the Red Cross is charged with the recruitment of nurses for the armed forces, attention might well be given by that organization to the extent to which the nurses now employed by the Red Cross in this country are replaceable by nurses' aides or other partially trained personnel. This applies particularly to the employment of considerable numbers of nurses in blood banks, in teaching of nurses' aides, in mobile units and in other activities in which their time does not seem to be, in many instances, wholly utilized.

The problem of supplying nursing personnel has become for the present even more acute than the problem of providing physicians. Under the auspices of the Procurement and Assignment Service for Physicians, Dentists, Veterinarians, Sanitary Engineers and Nurses a number of procedures are in contemplation which it is hoped will yield the names of every woman in the coun-

try ever qualified as a nurse and capable now of being drawn into nursing service. These plans will be announced as rapidly as they are developed. In the meantime a complete enrolment of young women in the U. S. Cadet Nurses Corps and serious consideration to the suggestions here made for the employment of available nurses will do much to help the rapidly growing crisis in the profession of nursing care.

MALARIA AND WORLD WAR II

The progress of medical science and of modern methods of sanitation have thus far proved adequate to prevent major epidemics in this war. In the past, epidemics took a greater toll both among the belligerents and among civilians than did weapons of war. Bubonic plague, cholera and smallpox seem today to belong to a distant past. Minor outbreaks of typhus may be expected among the underfed, vermin infested populations, but these can be readily controlled by methods of delousing, preventive vaccination and general quarantine measures. The most important military medical problem of the present war is malaria.

According to Stitt and Strong,[1] malaria by its prevalence is most important of all diseases in the world today. While the mortality and morbidity caused by this disease cannot be estimated closely, Russell [2] ventures, on such data as are available, that there are not less than three million deaths from malaria and at least three hundred million cases of malarial fevers each year throughout the world. The dispatch of our troops to highly malarial regions creates an immediate as well as a postwar problem. The problem of malarial epidemics is made acute by the global war. Malaria has always been one of the major scourges of the human race, influencing its health, retarding the progress of nations and affecting the course of many civilizations. Malaria was an important factor in the decline of moral and intellectual vigor which took place in Greece between 500 and 300 B. C. In India it is today the major cause of poverty and of lowered physical and intellectual standards.

Control of malaria among troops on many of our tropical frontiers presents a number of difficult problems. The program, according to Simmons,[3] includes such measures as protecting the soldier against mosquito bites, against infection if bitten and against a possibly long and fatal illness if infected. Reliance must be placed on (1) the correct selection of camp sites, (2) the spray killing of adult mosquitoes with pyrethrum extract, (3) chemoprophylaxis with quinine and atabrine, (4) the use of nets and screens, (5) protective clothing and (6) the organization and instruction of personnel.

The recent advances in malariology involve, according to Russell,[2] the development of synthetic antimalarial drugs, the pyrethrum spray killing of the mosquitoes and methods of species eradication of mosquitoes. Today the Japanese control all the cinchona of the Netherlands Indies. With Germany they also control the Dutch stocks of cinchona alkaloids, together with quinine factories. The Allied Nations had to resort, therefore, to the use of American bark in the form of totaquine. The drug in somewhat larger doses is as effective as quinine sulfate. Quinine, hailed for many years as a specific in the treatment of malaria, is not the ideal drug. Plasmochin, a quinoline derivative is effective against gametocytes, especially those of Plasmodium falciparum, but is relatively ineffective against the schizonts of the same species. Atabrine, derived from acridine, resembles quinine in its action against all species of schizonts and in its weakness in affecting any of the gametocytes. All three drugs are, however, alike in their inability in a percentage of cases to cure without the occurrence of relapses and in their failure in safe doses to prevent infection by sporozooites. Not one of the three has been found to be a true causal prophylactic, although each in small doses tends to suppress clinical symptoms.

The Q A P treatment—quinine atabrine plasmochin—as endorsed by the Subcommittee on Tropical Diseases of the National Research Council [4] represents an efficient treatment for acute malaria. The role of plasmochin, however, is now being subjected to reevaluation because of its toxicity. Totaquine or quinine sulfate (0.64 Gm.) is given three times daily after meals for two or three days until pyrexia is controlled. This is followed by atabrine (0.1 Gm.) three times daily after meals for five days. After two days of rest from medication, plasmochin (0.01 Gm.) is given three times daily after meals for five days. For mild cases atabrine and plasmochin or quinine and plasmochin combinations are satisfactory.

Russell points to the recent eradication of Anopheles gambiae in Brazil as the first accomplishment of this kind at any time in any land. Although costly, the experiment establishes for the first time the possibility that in some future time malaria, if not its vector, may be eradicated from the United States.

The problem of immunity to malaria has been the subject of a recent editorial in THE JOURNAL.[5] The malaria therapy of neurosyphilis offered many opportunities for the study of the problem of immunity in malaria. Whether effective serums or vaccines will be produced or whether a new and more effective specific drug will be developed cannot at present be predicted.

1. Strong, Richard P.: Stitt's Diagnosis, Prevention and Treatment of Tropical Diseases, ed. 6, Philadelphia, Blakiston Company, 1942, chapter 1.
2. Russell, P. F.: Malaria and Its Influence on World Health, Bull. New York Acad. Med. **19**: 599 (Sept.) 1943.
3. Simmons, J. S.: Progress in the Army's Fight Against Malaria, J. A. M. A. **120**: 30 (Sept. 5) 1942.
4. Weed, L. H.: The Critical Antimalarial Problem and Its Solution, J. A. M. A. **120**: 1043 (Nov. 28) 1942.
5. Malaria, J. A. M. A. **123**: 211 (Sept. 25) 1943.

DOES AMERICAN MEDICINE NEED A DICTATOR?

THE WAGNER-MURRAY-DINGELL BILL: III

Revolutions often produce dictators who rise by force of personality or leadership but usually only after the revolution has run much of its course. The Wagner-Murray-Dingell Bill proposes to supply the dictator for American medicine even before the revolution begins. Compulsory sickness insurance produces the least evils when control of the actual practice of medicine is placed under the democratic management of medical associations. The quality of the medical service under such systems deteriorates least in proportion to the extent to which the establishment and maintenance of standards and quality of medical practice are confided to medical organizations. The authors of S. 1161 have overlooked this lesson as they have many others in the field of medical practice. But they had little apparent medical aid in formulating their blueprint for American medicine.

In the Netherlands and Norway the medical profession resisted the attempts of Nazidom to break down the autonomy of the medical profession in spite of severe persecution. In so doing these physicians followed age long professional tradition. The whole body of physicians acting autonomously and democratically is the only institution that has ever succeeded in creating and enforcing standards of conduct not only in practice but in medical education and the operation of medical institutions.

S. 1161 makes a shallow pretense of recognizing this fact by proposing to create a committee containing representatives of the organizations concerned with medical practice. This committee is to be purely "advisory," without powers and with indefinite functions. It is to be appointed by the dictator whom it is supposed to advise. Provisions are not suggested whereby state or local professional bodies may exercise judgment and supervision at the only point where such judgment and supervision can be effective.

While the Surgeon General of the United States Public Health Service is proposed as the dictator, it must be assumed that he will follow the pattern of administrative organizations and appoint subordinates responsible to him alone. Does any one believe he can avoid political considerations in making such appointments? He is to have the power to determine who will be specialists, what specialties they will follow and who will remain general practitioners. In fact, the fate of all phases of medical practice is vested in this dictator.

The framers of the proposed law apparently neglected entirely any consideration of the quality of the medical service to be distributed. More than fifty pages of the bill are given to the details of administration and financial arrangements; not one word is printed as to how the standards of medical practice shall be kept at their present high stage. Mention is not made of measures that might maintain the steady upward progress of those standards that has been characteristic of the period during which their establishment and maintenance have been entrusted to the medical profession.

In the familiar pattern of advocates of compulsory sickness insurance, attention is focused on the political machinery that will distribute medical service; the quality of the service itself receives no notice. Medical care is a service given by physicians; the ability to diagnose and treat disease and protect the health of the public depends on the qualifications of the physician—on his education and training, his integrity, skill and initiative. The Wagner-Murray-Dingell plan is a blueprint for medical revolution, dealing with the sick and with the physicians who care for them as inanimate units to be moved at a dictator's will.

THE UTILIZATION OF HEALTH RESORTS FOR MILITARY RECONSTRUCTION

British physicians have found that health resorts are invaluable as centers for reconstruction of those disabled in war. Already in this war United States Army, Navy and Veterans Administration centers for rehabilitation are being established at many health resorts. The United States Army Medical Corps, for example, has established them at the Ashford General Hospital, White Sulphur Springs, W. Va.; the Station Hospital, Camp Carson, Colorado Springs, Colo.; the Fitzsimons General Hospital, Denver; the Army and Navy General Hospital, Hot Springs, Ark.; the Percy Jones General Hospital, Battle Creek, Mich.; the Moore General Hospital at Swannanoa (near Asheville), N. C.; the Station Hospital at Davis-Monthan Airfield, Tucson, Ariz., and the Miami Army Air Force Hospital at Miami, Fla.

The Bureau of Medicine and Surgery of the United States Navy has established hospitals at Asheville, N. C.; Yosemite, Calif.; Glenwood Springs, Colo., and Sun Valley, Idaho.

The Veterans Administration, it is said, is contemplating the establishment of hospitals at such health resorts as Saratoga Springs, N. Y.; Hot Springs, Salt Lake, Utah; Hot Springs, S. D.; Bay Pines, Fla., and Mineral Springs, Texas.

Examples of satisfactory utilization of health resorts for rehabilitation of our wounded soldiers and sailors are to be found at the Army's Ashford General Hospital at White Sulphur Springs, W. Va., and at the Navy's Naval Convalescent Hospital, Glenwood Springs, Colo.

Typical of the reactions of far sighted medical military officers is the pertinent statement recently made

by a colonel in the Army Medical Corps who is commanding officer of one of the larger Army convalescent hospitals: "From my experience in the last war, and as a medical officer since that time, I feel that one of the greatest steps which have been taken in this war has been the effort directed toward the rehabilitation of the injured soldier. I firmly believe that the health resort centers which are being used by the Army are playing an ever increasing part in this program."

American health resorts will play, this time, an extremely important part in the rehabilitation of those disabled by the war. This is an important step in the right direction.

Current Comment

MEDICAL AND SOCIAL HISTORIES TO BE SECURED ON SELECTEES

The Selective Service System on October 12 directed local draft boards to gather detailed medical and social histories of registrants classified for induction into the armed forces. Medical field agents attached to each of the country's 6,500 local boards are being appointed to assist. The information gathered will be made available only to examining physicians for the armed services at induction stations. Major Gen. Lewis B. Hershey, director of Selective Service, stated in a bulletin to draft boards that "The Selective Service System and the armed forces want to make certain that the greatest possible care is taken (1) to accept those registrants whose previous medical and social history indicates their ability to adjust themselves under situations of stress, including those who may be termed 'borderline' cases, and (2) to reject those registrants whose condition is such as positively indicates physical or mental breakdown, or failure to adjust themselves to the responsibilities of military service after being inducted." A procedure was also established for the review of the records of men rejected at induction centers or discharged from the armed forces for neuropsychiatric reasons. General Hershey stated that a local board, if it is of the opinion that such rejection or discharge was erroneous or the causes for such rejection have ceased to exist, may refer the registrant to the (Selective Service) medical advisory board. A study of 2,500 veterans of this war discharged before August 1942 showed that approximately 40 per cent were discharged because they were suffering from mental and emotional disorders which incapacitated them for military duty, and about 6.2 per cent of that number became so ill that they had to be hospitalized. General Hershey estimated that approximately 100,000 men will be discharged from the armed forces during this year for "nervous and mental reasons." Under the new program, which General Hershey has termed a medical survey, registrants will be required to fill out two forms—one containing an identity verification and one detailing the registrant's education. Both forms will be forwarded to state Selective Service directors, who will check the information against state files of persons who have mental diseases and with school authorities. The secondary school systems and state and county health, welfare and social organizations are asked to cooperate.

HOME CARE OF THE TUBERCULOUS

The National Tuberculosis Association has just made available four new pamphlets on "Home Care of Tuberculosis," which should be especially useful in times like these, when the demands on the medical and all of the accessory professions are so great. These pamphlets are directed to the family physician in charge, to the nurses, to the family and to the patient himself. It is recognized that home care is in no sense the equivalent of treatment in a modern sanatorium. However, in times of war it may become the only possible method. The pamphlet for the physician is planned primarily to acquaint him with the nature of the instructions given in the other three pamphlets and also to give him special information regarding tuberculin tests, demonstration of tubercle bacilli and uses of the x-rays. The pamphlet for nurses is devoted primarily to specific instructions regarding nursing care and the protection of the nurse herself. There are also recommended reading lists and answers to questions frequently asked by patients. The pamphlet for the family gives advice regarding preventive methods and also assistance in home nursing. The pamphlet for the patient is most instructive, written in simple language and exceedingly useful. These pamphlets may be obtained from the tuberculosis associations serving in given areas, which obtain the pamphlets at cost from the National Tuberculosis Association.

ARTICLES ON "SPA" THERAPY

In this issue of THE JOURNAL appears the first of a series of articles dealing with the use of health resorts in the treatment of disease. These articles are developed under the sponsorship of the American Medical Association's Committee on American Health Resorts. The material is being prepared by selected authors familiar with the various phases of the subject. This series of articles is particularly timely now. Civilian patients and military casualties alike require medical and hospital care which must be rendered by institutions and professional, technical and other personnel severely restricted under wartime demands for manpower. Every institution suitable for the care of the sick or the convalescent and every therapeutic resource available should be utilized to its utmost efficiency. Spas and spa treatment have had much more extensive attention in Europe than in the United States, yet this country can match every European health resort as to climate and natural characteristics of the waters. In the sharpened focus of wartime needs, the Committee on American Health Resorts offers the series of articles beginning this week as a scientific contribution to American medicine and a practical participation in the war effort.

MEDICINE AND THE WAR

In this section of The Journal each week will appear official notices by the Committee on War Participation of the American Medical Association, announcements by the Surgeons General of the Army, Navy and Public Health Service, and other governmental agencies dealing with medicine and the war, and such other information and announcements as will be useful to the medical profession.

ARMY

THE SCHICK GENERAL HOSPITAL

The Schick General Hospital, which was formally opened on October 7, is located 3 miles north of Clinton, Iowa. The hospital has a capacity of 1,514 beds and consists of 103 separate structures. The grounds consist of 89.6 acres of land enclosed by an 8 foot wire fence. There are a chapel, laundry, post exchange, post office, ambulance service, recreational facilities and air conditioned operating rooms. Prior to the formal opening of the hospital there were 2,687 patients admitted (Sept. 30, 1943), of whom 674 were operated on. The first patient was admitted on Feb. 15, 1943, and on the same day the first surgical operation was performed, on a soldier from this command. On the day of the formal opening there were 1,175 patients in the hospital, representing every overseas theater of operation. The allotment of nurses is 120 and of enlisted men 512. These men are being trained as operating room, x-ray and laboratory technicians as well as ward attendants. The staff of the Schick General Hospital trained the enlisted personnel of the Eighth General Hospital before it was sent overseas and is now training the Ninety-First General Hospital. Major Gen. Norman T. Kirk, the Surgeon General, has designated the Schick General Hospital as a Neurosurgical Center. The entire project represents an investment of more than $6,000,000.

The Schick General Hospital was named in honor of Lieut. William Rhinehart Schick, first army medical officer to be killed in action during the current war. Lieutenant Schick graduated from the University of Illinois College of Medicine in 1939 and was appointed a first lieutenant, medical corps reserve, April 28, 1941. He was killed when the bomber in which he was flying from the United States to Pearl Harbor was shot down during the raid on Pearl Harbor, Dec. 7, 1941.

Following is the medical staff attached to the Schick General Hospital:

Col. Dean F. Winn, commanding officer.
Lieut. Col. Lloyd E. Gould, executive officer.
Lieut. Col. Benjamin M. Banks, chief of medical service.
Capt. Wilson C. Merriman, executive officer, medical service, and chief, communicable disease section.
Capt. Harold B. Thale, chief of general medical section.
Capt. Harold Shellow, chief of dermatology section.
Capt. David W. Hilger, chief of neuropsychiatry section.
Capt. Lewis J. Dimsdale, chief of pulmonary-allergy section.
Capt. Emanuel M. Rappaport, ward officer, neuropsychiatry section.
Capt. Ralph W. Barris, ward officer, neuropsychiatry section.
1st Lieut. Manuel Sall, ward officer, neuropsychiatry section.
Capt. Kermit G. Dwork, ward officer, officers' and women's section.
Capt. Harris V. Lilga, ward officer, gastrointestinal section.
Capt. Max J. Klainer, ward officer, cardiovascular section.
1st Lieut. David Finkelstein, ward officer, cardiovascular section.
Lieut. Col. William J. Carrington, chief of surgical service and chief, women's section.
Major Moser L. Stadiem, assistant chief of surgical service and chief, officers' section.
Major Don C. Robertson, chief of general surgery section.
Capt. Willard H. Bernhoft, ward officer, general surgery section.
Major Joseph E. Milgram, chief of orthopedic section.
Capt. Frank H. Stelling, ward officer, orthopedic section.
Capt. Richard U. Peterson, ward officer, orthopedic section.
1st Lieut. Rolf Johnson, ward officer, orthopedic section.
1st Lieut L. A. Barrow, ward officer, orthopedic section, and ward officer, women's section.
Major Samuel Shenkman, chief of neurosurgery section.
1st Lieut. Irving J. Speigel, ward officer, neurosurgery section.
Major Edward N. Anderson, chief of urology section.
1st Lieut. Lloyd L. Wells, ward officer, urology section.
Major Francis B. Blackmar, chief of E. E. N. T. section.
Capt. Richard W. Garlichs, assistant chief of E. E. N. T. section.
Major Daniel R. Mishell, chief of septic surgery section.
Capt. Leo C. Harris, ward officer, officers' section, and consultant on thoracic surgery.
1st Lieut. Solomon Winokur, chief of physical therapy section.
Capt. Jack Milowsky, chief of anesthesia and operating section.
Major Henry Edstrom, chief of x-ray service.
Capt. Julius Rosenthal, chief of laboratory service.
1st Lieut. Harney M. Cordua, assistant, laboratory service.
Capt. Alonzo H. B. Drake, chief of outpatient service.
Major Sidney Olans, registrar.
Lieut. Col. I. J. Frisch, public relations officer.
Major E. G. Johnson, commanding officer, medical detachment, medical department, and director of training division.

FOREIGN MAPS WANTED FOR MILITARY USE

The Army Map Service, Corps of Engineers, U. S. Army, is seeking large scale maps (1:1,000,000 or larger) of areas outside the United States and Canada; road maps, topographic and geological maps; detailed topographic maps, city plans and port plans, as well as guide books and travel folders, gazetteers, postal guides and important atlases; aerial photographs, survey notes and geodetic control data (the more recently issued the better). If any of this material is not available as a gift, it must be specified as such; reproduction will be made and the originals returned to the owner. The Army Map Service does not need United States government issuances and such obvious sources as the National Geographic Society, as this material is already on file. Information concerning available material of this kind should be submitted to the branch office in one's locality:

Chicago Library Branch, Army Map Service, 79 West Monroe Street, Chicago, attention Miss Barbara C. Todd, phone Central 3240.
New York Library Branch, Army Map Service, 1270 Sixth Avenue, New York City, attention Miss Viohla Klipell, phone Circle 6-4250.
New Orleans Library Branch, Army Map Service, 900-A Maritime Building, New Orleans, attention Lieut. Chris. R. Ansel, phone Canal 1293.
San Francisco Library Branch, Army Map Service, 74 New Montgomery Street, San Francisco, attention Capt. Norman F. D'Evelyn, phone Exbrook 2009.

SOLDIER'S MEDAL AWARDED FOR HEROISM AT ALGERIAN BASE

Twenty-two medical officers and enlisted men of the Army Medical Corps and two officers of the Air Corps were recently awarded the Soldier's Medal for outstanding heroism during an explosion of bombs on June 26, 1943 at an Algerian base under the command of Major Gen. James H. Doolittle, commanding general of the Northwest African Strategic Air Force, according to an announcement made by the War Department, Washington, D. C., October 10. When a number of bombs exploded at an ordnance area these officers and enlisted men aided in removing the injured and placing them in ambulances and in checking the spreading flames, in spite of the danger of continued explosion. The citation states "The heroic action and valiant work continued until they were forced to withdraw by superior authority. The heroism, valor and courage in the face of great danger reflects credit on themselves and on the armed forces of the United States." The medical officers decorated are Frederick D. Koehne, Major, M. C., Oakland, Iowa; Raymond J. Beal, Captain, M. C., Kansas City, Mo.; Milton J. Layden, Captain, M. C., Philadelphia; Theodore C. Papermaster, Captain, M. C., St. Cloud, Minn.; Wayne W. Warren (dentist), Captain, M. C., Fort Dodge, Iowa; James L. Smitherman, First Lieutenant, Air Corps, Overton, Texas.

FIRST LIEUTENANTS IN NURSE CORPS NOW MAY BE ASSIGNED TO WARD DUTY

The War Department announced on October 14 that members of the Army Nurse Corps now are eligible for more rapid promotion under a new table of organization which makes first lieutenants available for ward duty in addition to second lieutenants. Heretofore nurses in the grade of first lieutenant virtually were limited to duty in the chief nurse's office or were placed in charge of an operating room or of nurses' quarters. However, because of the importance of bedside care of wounded and sick, and to give qualified nurses a chance for advancement, the new organizational setup was effected. Under it first lieutenants may be put in charge of wards, sections or complete nursing services such as chief of surgical nursing service, chief of medical nursing service, chief of psychiatric section, orthopedic section or of single similar wards. At the same time it was announced that nurses over 45 are not being sent overseas for duty with the armed forces but are being given the opportunity of caring for battle casualties in general hospitals in the United States, to which wounded are being sent for treatment with the least possible delay. It was announced too that nurses who return from a theater of operations and desire further overseas duty may, after six months in the United States, be considered for reassignment overseas provided they are physically qualified.

AMERICAN MEDICAL SOCIETY IN ENGLAND

At the suggestion of Brig. Gen. Paul R. Hawley, chief surgeon in the European theater of operations, a medical society was organized for the members of the Medical Corps in that theater. The society has been named the American Medical Society, ETO. All officers of the U. S. Army Medical Corps are automatically made members of the society. The purpose of the organization is to provide a means for an exchange of current professional experience and intelligence of investigative work carried on by the members of the U. S. Army Medical Corps in this theater. Members of the Medical Corps of the several Allied Nations are invited as guest speakers. Monthly meetings are being held at the various general hospitals with sessions limited to one day. Subjects of interest to all branches of the Medical Corps are presented at each meeting and various problems are demonstrated by medical exhibits in much the same manner as is done at medical meetings held in the United States.

The first meeting, which was held at the 298th General Hospital on June 23, was addressed by General Hawley. At this meeting the following officers were elected: Lieut. Col. Robert Zollinger, M. C., Fifth General Headquarters, president; Lieut. Col. William F. McFee, M. C., Second Evacuation Hospital, vice president; Major Clifford Graves, M. C., Third Auxiliary Group, secretary-treasurer; Col. E. J. Tracy, M. C., Eighth Air Force, member at large; Lieut. Col. R. S. Muckenfuss, M. C., First General Medical Laboratory, member at large.

Other meetings have been held at the Thirtieth General Hospital and the Second General Hospital.

ARMY GENERAL HOSPITAL NAMED FOR ARMY NURSE

The War Department announced on October 16 that an army general hospital (the former Chicago Beach Hotel), Chicago, has been named the Ruth M. Gardiner General Hospital in memory of the first army nurse confirmed as killed in a theater of operations in this war. Second Lieutenant Gardiner was a member of the Army Nurse Corps attached to a medical squadron of the Army Air Forces and was killed in a plane crash in July 1943 at Nankek, Alaska, while serving as an air evacuation nurse. Lieutenant Gardiner graduated with the second class of flight nurses from the School of Air Evacuation, Bowman Field, Ky., on Feb. 18, 1943 and left there for evacuation duty with the Eleventh Air Force in Alaska on April 22.

FIRST FLIGHT NURSE RETURNS FROM COMBAT ZONE

According to the War Department, Second Lieut. Henrietta Richardson was the first flight nurse to return to the United States from a combat zone. Serving with an Army Air Forces Air Evacuation Unit in North Africa, she found that "the morale factor is an important part of the flight nurse's job." A former airline stewardess, Lieutenant Richardson was stationed with the twenty-four other flight nurses in her squadron at the Maison Blanche airport near Algiers. Her unit flew shuttle routes from Maison Blanche into Tunisia, Tellergma and Youks-Leban and back to Algiers, Oran and Casablanca. From March 12, 1943 to May 12, 1943 she accumulated 132 hours of combat evacuation flying. Lieutenant Richardson is a graduate of St. Vincent's School of Nursing, Los Angeles. She entered the Army Nurse Corps on Sept. 14, 1942 and left the United States on Christmas day of that year for overseas assignment.

SURGEON GENERAL OF BRITISH ARMY FETED

Major Gen. Norman T. Kirk, surgeon general of the United States Army, gave a dinner on October 12 at the Mayflower Hotel, Washington, D. C., in honor of Lieut. Gen. Sir Alexander Hood, visiting surgeon general of the British army. Other distinguished guests who attended the dinner were Rear Admiral Luther Sheldon, Major Gen. R. W. Styer, Major Gen. Leroy Lutes, Major Gen. Shelley U. Marietta, Major Gen. George F. Lull, Major Gen. Albert W. Kenner, Major Gen. Merritt W. Ireland, Brig. Gen. Hugh J. Morgan, Brig. Gen. Raymond W. Bliss, Brig. Gen. Fred W. Rankin, Brig. Gen. George Dunham, Brig. Gen. Russell Reynolds, Brig. Gen. Raymond A. Kelser, Col. Arden Freer, Col. Tracy S. Voorhees, Col. Henry C. Chenault, Col. Arthur B. Welsh, Col. Frank S. Gillespie, Col. R. C. McDonald, Col. James R. Hudnall, Col. Stanhope Bayne-Jones, Col. Paul I. Robinson, Col. Marion F. Du Frenne, Col. Leonard Rowntree, Col. Frank Strong, Col. Rex Diveley, Col. George R. Callender, Col. James R. McDowell, Col. William E. Shambora, Col. Silas B. Hays, Lieut. Col. Robert John Carpenter, Major C. R. Durnford, Major Robert S. Gearhart, Dr. Warren F. Draper, assistant surgeon general of the United States Public Health Service, and Norman Davis.

PHYSICAL DISABILITY DISCHARGES OF THE ARMY

For the twenty month period ended July 31, 1943 discharges from the Army of the United States for physical disability totaled 208,296 men, according to an announcement made by the War Department recently. While more than half of these discharges were of a miscellaneous nature, the larger classifications in order were neuropsychiatric, heart disabilities, impairment of vision, tuberculosis and disabilities resulting from wounds. According to statistics from the Office of the Surgeon General, the percentage of disability discharges resulting from neuropsychiatric causes have increased within the twenty month period. Major Gen. Norman T. Kirk, Surgeon General, stated that "the Army has not granted disability discharges to any men who could be used effectively in the military prosecution of this war."

MEDICAL CORPS OFFICERS NEEDED FOR SERVICE IN PARACHUTE UNITS

The War Department has announced, according to the *Army and Navy Journal* of October 2, that medical corps officers in company grades and not over 32 years of age are needed for service in parachute units. Volunteers on acceptance will be sent for training to the Parachute School, Fort Benning, Georgia. Physical standards are those prescribed in section V, War Department Circular 155 of 1942.

EVACUATION HOSPITAL IN ITALY BLOWN DOWN DURING STORM

As a result of a heavy rain and wind storm which leveled every tent in a great field evacuation hospital with the Fifth Army in Italy within five minutes, 1,600 sick or wounded soldiers had to be transferred to a nearby tobacco warehouse, according to an item published in the Chicago *Tribune*, October 13. Lieut. Col. Phil A. Daly of Chicago, who superintended the removal, is director of the hospital staff, most of whose members came from the Michael Reese Hospital, Chicago. Two hundred of the patients most seriously ill were moved to a big barn and hayloft across the field. All this was accomplished in less than two hours. Colonel Daly stated that "It was really a mess, with mud over everything. How we got them all out of there, I don't know. If we had planned this it would have taken two days. The storm was almost a tornado. It blew over an x-ray generator." Capt. Philip Marcus of Chicago, a member of the medical staff, said that one operation was finished under the operating table by flashlight after the tent blew down.

U. S. ARMY TRANSPORT SHAMROCK (EX AGWILEON) DESIGNATED AS HOSPITAL SHIP

The War Department, Washington, D. C., in General Orders No. 52, states that on Aug. 3, 1943 the United States Army transport *Shamrock* (ex *Agwileon*) was designated as a military hospital ship, in accordance with international practice, as set forth in the provisions of the Hague Convention X of 1907. In the future the United States Army hospital ship *Shamrock* will be operated in accordance with the provisions of applicable treaties. Notification of this designation was delivered through channels to the German, Hungarian, Bulgarian and Rumanian governments on August 12. The ship's master of this and all other United States military hospital ships will at all times maintain sufficient copies of this general order for presentation to any authorized agent of an enemy belligerent who may require it for inspection.

INDIANA UNIVERSITY MEDICAL CENTER HOSPITAL UNIT ARRIVES IN ENGLAND

According to word recently received at the Indiana University Medical Center, Bloomington, members of the medical division of General Hospital 32, organized and sponsored by the Indiana University Medical Center, have arrived in England following field training at Camp Bowie, Texas. The unit is composed of doctors, dentists and nurses from Indiana, who were inducted at ceremonies held at the Medical Center on May 13, 1942. During the organization of this unit it was planned to include 700 persons, including 120 nurses, but, since the unit was divided after arrival at Camp Bowie, the information received at the Medical Center did not state how many of the original complement were included in the group arriving in England.

AIR SERVICE COMMAND INSTALLS NEW TYPE X-RAY MACHINE

The latest type, money-saving x-ray machine, equipped with a photoroentgen unit, was recently installed at the Air Service Command, Patterson Field, Fairfield, Ohio. The old style x-ray machine with 14 by 17 inch plates was expensive to operate, while the new machine produces pictures only 5 by 7 over all at a nominal expense. The new machine has film specially mounted on reels requiring a short twist of a dial for a change, the procedure being the same as a roll of film in a camera. A special type tube is used also, which permits constant usage without burning out. This procedure makes it possible to x-ray the entire personnel of the Air Service Command and Patterson Field, 28,000, at the rate of 2,000 weekly. Col. John M. Hargreaves is chief of the medical section of the Air Service Command at Patterson Field.

FIRST CLASS OF WACS ENTERS ARMY MEDICAL TECHNICIAN SCHOOL

According to the War Department, 145 enlisted women of the Women's Army Corps began training on September 10 at the Army-Navy General Hospital in Hot Springs, Ark., as medical, surgical, x-ray, dental and laboratory technicians to serve with the Army in hospitals in this country and overseas. In addition to the enlisted Wacs, twelve WAC officers also began the course in order to take over future training and administrative staff jobs at the school, thus releasing medical corps men. The course for x-ray, dental and laboratory technicians will last three months; that for medical and surgical technicians, two months.

PHYSICAL EFFICIENCY AMONG SOLDIER TRAINEES SHOWS IMPROVEMENT

The War Department, Washington, D. C., announced on October 2 an average improvement of 21 per cent in physical efficiency among soldier trainees in the first term of participation in the Army Specialized Training Program. Performances were recorded in seven events among 2,557 trainees at the twelve institutions in which the program had its inception, both at the start of the course and approximately three months later. Gains in various events ranged from 6 to 30 per cent. Trainees devote six hours weekly to physical training.

ARMY PERSONALS

Col. Crawford F. Sams, former chief surgeon in the Middle East Theater of Operations, has returned to Carlisle Barracks, Pennsylvania, to become director of military art at the Medical Field Service School, according to an announcement by the War Department, September 30. Colonel Sams went overseas late in 1941 to help build bases and establish medical service in the Middle East for the U. S. Army personnel. He was in Tobruk when it was bombed eleven times in twenty-four hours and was stationed for a time at Cairo. Later he was assigned to General Montgomery's British Eighth Army as an observer and was with the group when it was attacked by Marshal Rommel's forces at Gozzala in May 1942. Colonel Sams graduated from Washington University School of Medicine, St. Louis, in 1929. Colonel Sams was assistant department surgeon and for a time acting department surgeon in the Panama Canal Department from 1937 to 1939 and was instructor in logistics and medical service in the Infantry School from 1939 to 1941. During 1935 and 1936 he was director in the Department of Military Art at the Medical Field Service School, the same position to which he has just been assigned. Colonel Sams has been awarded the Order of the British Empire, Legion of Merit and Star of Africa, as well as American Defense ribbons, the American Victory medal from the last war and the Middle East-North African campaign ribbon.

According to the Franklin (Ind.) *Star*, September 23, word was recently received that Capt. Frank P. Albertson, formerly of Trafalgar, Ind., is confined to an evacuation hospital in the South Pacific with injuries received on Guadalcanal, September 3. Captain Albertson, who graduated from the Indiana University School of Medicine, Indianapolis, in 1934, for sixteen months was stationed on various Hawaiian Islands after entering the service but was dispatched by plane on a mission to the South Pacific in July 1943.

According to the Auburn (Calif.) *Journal* of August 28 Col. William H. Smith recently assumed the post of commanding officer of the U. S. Army General Hospital in Auburn, Calif. Colonel Smith graduated from Washington University School of Medicine St. Louis, in 1906. After graduating from the Army Medical School he was commissioned in the regular army medical corps in 1909. He served with the American expeditionary forces in Vera Cruz in 1914.

Lieut. Col. Loyal Davis, consultant to the Army's chief surgeon, was in Chicago recently on a brief leave after a full year in the European theaters of war.

NAVY

STREETS NAMED IN HONOR OF MEDICAL DEPARTMENT PERSONNEL

The Bureau of Medicine and Surgery has named nine streets on the reservation of the new U. S. Naval Hospital, Dublin, Ga., for medical department personnel killed while on active duty since Dec. 7, 1941, according to the *Army and Navy Journal* of September 11.

Gendreau Circle honors the memory of Capt. Elphege A. M. Gendreau (MC), U.S.N., who was killed in combat action in the South Pacific on July 21, 1943; Captain Gendreau was force surgeon of the Pacific Fleet. Blackwood Drive is named for Comdr. James D. Blackwood (MC), U.S.N., senior medical officer of the U. S. S. *Vincennes*, which was lost the night of Aug. 8-9, 1942. Johnson Drive, Alexander Drive and Crowley Avenue are named for three officers who were killed in action at Pearl Harbor on Dec. 7, 1941. They were Comdr. Samuel E. Johnson (MC), U.S.N.; Lieut. Comdr. Hugh R. Alexander (MC), U.S.N., and Lieut. Comdr. Edward E. Crowley (DC), U.S.N.

Evans Avenue will honor Lieut. Comdr. Edward E. Evans (MC), U.S.N., who was killed during action in the Solomons on Dec. 12, 1942. Neff Place will be in memory of Lieut. Comdr. James B. Neff (MC), U.S.N. Commander Neff was senior medical officer of the U. S. S. *Juneau*, which was sunk on Nov. 13, 1942 in the South Pacific. Trojakowski Avenue and Morrow Place will honor Comdr. W. C. Trojakowski (DC), U.S.N., killed in action in the South Pacific on June 12, 1942, and Lieut. (jg) Edna O. Morrow, Nurse Corps, U. S. N., who was killed in an aircraft accident near San Francisco, Jan. 21, 1943, while returning from the Pacific war zone.

NAVY DOCTORS REMOVE LIVE SHELL FROM HIP OF WOUNDED ENLISTED MAN

While standing at his post aboard an American warship in the South Pacific, Allen L. Gordon, a fire controlman third class of Rock Island, Ill., was struck below the left chest by a 20 millimeter antiaircraft shell, which pierced his intestine and lodged in his left hip. The shell did not explode. An emergency operation was performed on board the battleship to repair his intestinal tract. Later the sailor was taken ashore and, although the navy hospital at this outpost was still under construction, under the direction of Lieut. Comdr. Harold W. Jacox, formerly on the staff of the Western Pennsylvania Hospital, Pittsburgh, several days were spent in trying to locate the "dud" by x-ray. When the shell was located, a steel plate was prepared and the operation was performed in a few minutes by Lieut. Comdr. Jesse R. Griffith and Lieut. William C. Wycoff, both from the Western Pennsylvania staff in Pittsburgh. Although infection set in, Gordon was strong enough eventually to return to the United States, where treatment was continued.

BASE AND MOBILE OPTICAL UNITS

The Bureau of Medicine and Surgery, Washington, D. C., in its weekly release dated October 11, states that a number of optical units have now been organized and equipped by the bureau. Its mission is to provide emergency spectacle replacement and repair service, without charge, to all naval personnel in combat areas and other places not accessible to civilian facilities; also to supply urgently needed corrective spectacles to naval personnel under like circumstances. There are two types of these units, base and mobile, and both are prepared to provide corrective or replacement lenses sufficiently accurate to meet the needs of combat personnel. The base unit will be in a relatively fixed installation, while the mobile unit can be easily transported from place to place. Each unit is a component of the Medical Department of the Navy and carries technical personnel, officer and enlisted, selected on the basis of previous optical service and special training. The units will operate under the orders of the commanding officer of the area in the same manner in which naval base hospitals and naval mobile hospitals are now being operated.

HIGH SPEED FLYING AMBULANCES FOR NAVY AND MARINE CORPS

According to a recent release from the Postwar Aviation Bureau, Chicago, a new high speed flying ambulance for navy and marine corps use, known as the Howard-Nightingale, is a small transport which will carry two badly wounded men in wire stretchers and a crew consisting of pilot, co-pilot and nurse and can operate from bases as far as 200 miles from battle zones. It is manufactured by the Howard Aircraft Corporation of Chicago and St. Charles, Ill., and is said to have the speed of at least 2½ miles a minute. It is capable of landing in almost inaccessible spots, picking up the wounded and carrying them speedily to well equipped hospital units without shock or further injury to broken bones. The first of these ambulances are either on their way across the sea or have reached combat zones.

COMMANDER BARTHOLOMEW W. HOGAN RECEIVES SILVER STAR AWARD

The Navy Department, Washington, D. C., announced on September 10 the presentation of the Silver Star Medal to Comdr. Bartholomew W. Hogan (MC), U.S.N., by Secretary of the Navy Frank Knox. Commander Hogan's award was accompanied by the following citation:

> For conspicuous gallantry and intrepidity in action as Senior Medical Officer of the U. S. S. *Wasp* when that ship was torpedoed by enemy Japanese submarines on Sept. 15, 1942. With his carrier swept by flaming gasoline and rocked by explosions, Commander Hogan, despite his own serious wounds, worked tirelessly, caring for the injured until forced to abandon the stricken ship. His outstanding professional skill and heroic devotion to duty throughout these perilous hours were in keeping with the highest traditions of the United States Naval Service.

Commander Hogan, who graduated from Tufts College Medical School, Boston, in 1925, in which year he entered the service, is now on duty at the Bureau of Medicine and Surgery, Washington, D. C.

FIRST WOMAN MEDICAL OFFICER TO BE GIVEN RANK OF LIEUTENANT COMMANDER

Lieut. Comdr. Catherine Louise McCorry, MC-V(S), (F), U.S.N.R., is the first woman medical officer to be given this rank since the Navy has accepted women doctors, according to the Bureau of Medicine and Surgery in its weekly release dated October 4. Lieutenant Commander McCorry graduated from Loyola University School of Medicine, Chicago, in 1930 and has been employed by the department of public health in Illinois as a psychiatrist and internist since completion of her training. It is expected that she will be ordered to active duty on or about October 25.

COMPLETE INSPECTION OF ALL NAVAL CONVALESCENT HOSPITALS

The *Army and Navy Journal* of September 25 states that Rear Admiral Luther Sheldon Jr. (MC), U.S.N., assistant chief of the Bureau of Medicine and Surgery, and Comdr. F. J. Braceland (MC), U.S.N.R., neuropsychiatry section, have completed an inspection of all naval convalescent hospitals in the western and southwestern parts of the country. As a result of this trip Admiral Sheldon is convinced that with some additional expansion the Medical Department of the Navy is in a position to handle any burden that may be thrown on it by reason of the war in the Pacific.

MISCELLANEOUS

WARTIME GRADUATE MEDICAL MEETINGS

The chairman of the committee in charge of Wartime Graduate Medical Meetings has prepared a pamphlet indicating the nature of the organization, the regional committees, the areas of activity, a report of the undertakings of various regional committees, a list of the national faculty and the subjects discussed, and some answers to questions that have been propounded in largest numbers. This manual is exceedingly useful to all those who are participating in this important graduate education. Copies may be obtained by addressing Dr. Edward L. Bortz, 4200 Pine Street, Philadelphia.

PROMINENT PROFESSORS OF MEDICINE IN ARGENTINA DISMISSED

As a result of the Ramirez government's order that all office holders who signed a recent prodemocratic manifesto be ousted, a number of professors of the highest standing in the universities of Argentina have been affected. Hundreds of medical students are reported to have crowded into the operating theater to hear the world famed Dr. Bernardo A. Houssay deliver his final lecture, and hundreds of other students were said to have jammed into the final lecture of Prof. Alejandro Ceballos, another well known Argentinian. Lectures by Dr. Nicolas Romano and Dr. Marino E. Castex at the Hospital Naccional de Clinicas also attracted hundreds of Argentinians, who might otherwise have been unable to demonstrate their opposition to the nation's neutrality and its military government. Ramirez is understood to have stated that, besides being dismissed from public office, these men will not be allowed to leave the country.

COMPACT X-RAY UNITS FOR AIRCRAFT CARRIERS

Facilities for instant x-ray diagnosis of wounds and injuries are now available to airmen based on many U. S. aircraft carriers on the high seas. These war tailored x-ray units, developed and manufactured by the Kelley-Koett Manufacturing Company, Covington, Ky., are being installed in the Kaiser built carriers. The carrier borne unit includes a "rotary converter" to transform the ship's direct current to alternating current for x-ray uses. Many war plants use this specially designed x-ray equipment to detect flaws in vital metal parts before they are made into tanks, planes and guns. Major Gen. Norman T. Kirk, Surgeon General of the Army, who recently made a personal inspection of the Kelley-Koett Manufacturing Company, commended the workers for meriting the Army-Navy E and said "The x-ray machines you are making are used to salvage men during a time when weapons of destruction are being made for killing."

MEDICAL AND SURGICAL RELIEF COMMITTEE OF AMERICA

The Medical and Surgical Relief Committee of America, with headquarters at 420 Lexington Avenue, New York City, is conducted by a nationwide group of physicians and surgeons to send medical aid to the armed and civilian forces of America and the Allies. In response to a request from the First Group Civil Air Patrol of Cleveland the committee is donating to this unit emergency medical supplies to supplement its minor first aid equipment. Packed in portable cases, the committee's contribution includes sulfonamide drugs, anesthetics, antiseptics, an instrument roll for minor surgery and many other essential medical items. These items will be used in ambulances or transported by airplane directly to the scene of disaster. According to Dr. J. P. Hoguet, medical director of the committee, over $1,500 has been donated by the committee to civil air patrols. Emergency medical field sets and other supplies have also been sent to C. A. P. units in Falmouth, Mass.; Reno, Nev.; Beaumont, Texas, and Pascagoula, Miss.

WOMEN PHYSICIANS NEEDED IN ARMY AND NAVY MEDICAL CORPS

A nationwide campaign will be opened on December 4 by the American Women's Medical Association to stimulate applications by women physicians for commissions in the Army and Navy Medical Corps, according to an item in the New York *Times,* October 5. The drive, which will be under the direction of Dr. Zoe Allison Johnston, Pittsburgh, national president of the association, will start its campaign at the annual meeting of the organization's executive board in Pittsburgh. The medical department of the Navy is reported to have openings in each of three ranks, lieutenant junior grade, lieutenant senior grade and lieutenant commander, and the major demand is for women laboratory physicians, psychiatrists and pathologists. Dr. Eva Carey, president of the Pittsburgh Women's Medical Society, stated that, "While there is no present surplus of women doctors, there is available a valuable supplement to the male contingent."

SEDATIVES DONATED TO RECUPERATION CENTERS

Four thousand capsules of sedatives have recently been donated to the War Shipping Administration for use in recuperation centers in England and North Africa. Dr. Joseph P. Hoguet, medical director of the Medical and Surgical Relief Committee of America, pointed out that many seamen resting in War Shipping Administration convalescence posts abroad have manned ships loaded with explosives, many more have traveled through waters infested with submarines, and others are survivors of torpedoed merchant vessels. Many of these men are tense from the memory of grim ocean crossings, from the shock of combat or shipwreck and cannot sleep. These mild sedatives will relax strained nerves and ensure them a normal night's rest.

Sixteen large emergency medical field sets consisting of two valise sized cases for use by doctors for wounded and ill merchant seamen were also donated by the committee. These sets contain drugs, antiseptics, bandages, sutures, syringes, and minor surgery instruments to meet any emergency. They are carefully packed for immediate use, are portable, and can be carried directly to where the casualties are.

BRIG. GEN. JAMES S. SIMMONS AWARDED SEDGWICK MEDAL

Brig. Gen. James S. Simmons, director, Preventive Medicine Division, Office of the Surgeon General, Washington, D. C., was awarded the William Thompson Sedgwick Memorial Medal during the annual meeting of the American Public Health Association in New York, October 12. The medal is awarded each year for distinguished service in public health. Charles-Edward A. Winslow, Dr.P.H. and winner of the Sedgwick Medal in 1942, presented the award. Brigadier General Simmons graduated from the University of Pennsylvania School of Medicine, Philadelphia, in 1915 and entered the medical corps as a first lieutenant in 1916. He has devoted more than a quarter of a century to the upbuilding of public health laboratory service in the military establishment. At the outbreak of the present war, Brigadier General Simmons was entrusted with the organization of a division of preventive medicine in the Office of the Surgeon General.

PRISONER OF THE JAPANESE

According to a recent item in the Denver *Post,* 1st Lieut. William DeBacker, who was taken prisoner by the Japanese in the Philippine Islands, sent a message to his wife that he is in a prison camp in the Philippines and is well. Lieutenant DeBacker, who practiced medicine in Pueblo, Colo., before entering the service, graduated from the University of Colorado School of Medicine, Denver, in 1940.

PUBLIC HEALTH UNDER HITLER

NDZ of September 3 states that, besides the other welfare measures taken by the party of the state, medical help is of great importance to the civilian population after air raids. An important field of activity has thus arisen for the DRK, reports Heudtla, oberstführer of the DRK, in the periodical *Das Deutsche Rote Kreuz*. In raided areas the Red Cross disposes of thousands of Red Cross nursing auxiliaries who have been trained in first aid, and men and women assistants, besides nurses working in hospitals. They are always on call for an emergency, mainly for the medical patrols which set out immediately after an air raid.

When heavy destruction is caused among dwellings, doctors' practices are frequently destroyed too, so that medical attention for the sick and injured may be difficult for the first few hours and days after a raid. That is where the DRK patrol service comes in. The Red Cross emergency cars or simple ambulance cars, staffed with a doctor and several Red Cross assistants, cruise through the streets as "mobile ambulances" to give first aid to persons suffering injury during the raid. The seriously injured are often taken to hospitals immediately. Of great value too is the help your neighbor scheme, of all members of the Red Cross, who are trained in first aid and who render effective aid to the injured while the raid is still in progress and thus prevent their condition from becoming more serious.

Medical stations have been set up in the big public air raid shelters to attend to the sick and injured. They are mainly staffed with women assistants of the Red Cross. Red Cross personnel also serve on evacuation trains from the moment they leave the raided areas until they arrive in the reception areas. In order to assure on an even wider scale the medical care of the civilian population hit by the air war, there is a continuous flow of fresh forces from the headquarters of the DRK to action stations. As the motorized units, such as the Red Cross emergency cars, busses and ambulances increase, all over the reich persons with special aptitude for such work form special standby units and, after a specialized training of several months, are sent to the raided areas. Well timed and generous planning is combined with constant readiness of the Red Cross forces to do their utmost. The sacrifices which this war demands of the civilian population are hard and painful.

Radio Hilversum (Dutch home service) of September 12 states that for the third time since its foundation the Medical Front held a national convention in Utrecht. The first speakers were Dr. Keyer, head of the Department of Public Health, and Dr. Goette, leader of the Medical Front. After them the leader spoke. From his speech it appeared that some 500 doctors are required to go to Germany and are reluctant to go. Among other things, Mussert said "If we consider that it is the duty of every European to fight for the future of Europe, why should those 'gentlemen' be allowed to stand aloof? They are always coming with touching stories about the fate of our workers in Germany. If they are too small minded to help the Germans, why don't they go and help their fellow countrymen in Germany? For this reason I assure you, my comrades, that I shall do everything in my power to send 500 or 1,000 doctors to Germany."

Algemeen Handelsblad of July 2 gives the reasons why those doctors who have protested against the recent decrees imposed on them by the reich commissar have been put into concentration camps. The cause was their first letter of protest and not the second. . . .

"Measures have been taken by the sicherheitspolizei against the demonstrators, whose conduct must be considered serious. They are now in concentration camps, where they can ponder on the shortcomings of their misleaders. They are awaiting their punishment. In addition, their property will be confiscated in accordance with paragraph 1 of order number 33 of 1940.

"Some of these demonstrating doctors have chosen to disappear. Their surgeries have been sealed by the sicherheitspolizei. This incident also appears to be evidence of the constant collaboration between certain intellectual circles and Orange-Bolshevik messengers, which was proved recently in Amsterdam during the proceedings against the instigators of the attack on the population register.

"It is not at all a question here of the second letter sent to the reich commissar, which the English radio announced recently even before the letter had reached the addressee. In reality a few similar letters arrived only a few days later. This showed that the writers of the letter had been listening to the English broadcasts or had let themselves be guided by a group acting according to instructions from the London émigré clique. For these reasons no one will be surprised that such actions will have very unpleasant consequences for the writers concerned."

Reich Health Leader Dr. Conti, according to DNB of July 31, has ordered all members of the medical professions, especially doctors, dental surgeons, dentists and nature cure practitioners who use x-ray equipment, to register with the competent reich defense commissioner, who will pass on the details to the office of the chief medical officer. X-ray apparatus and tubes which are not in use at present must be registered by the respective owners. This does not apply to manufacturers and dealers. Any change of ownership after registration must also be reported. Registration must be made not later than September 1.

Gardista, Bratislava, August 8, writes: At the invitation of the Slovak University Students' Association, German soldier students from the front who had been seriously injured came to Piestany some days ago. When I spoke with them about the fall of Orel and Catania they expressed neither apprehensions nor doubts but only dislike of journalistic expressions such as "successful disengagement from the enemy" (erfolgreiche Absetzung vom Feinde) or "disguised maneuvers" (maskierte Manöver), which fail to convince.

According to *Der Neue Tag* of August 7 the municipality of Olomouc has built a new emergency hospital in Blasius Square in addition to that already existing in the Neugasse (New Street). The new hospital, which will be for scarlet fever, diphtheria and similar diseases, is a two story building and has the most up to date medical equipment. It is run by a senior doctor assisted by two women doctors. The hospital holds 120 patients and is the largest in northern Moravia.

The *Journal officiel*, August 20, published act number 430, dated July 29, 1943, enforcing the act of Dec. 16, 1942 on the premarital medical examination certificate. The prospective husband and wife are from now on both under compulsion to produce a prenuptial certificate not more than one month old, simply stating that the applicant was medically examined without any other indication.

Norwegian nurses are now being hard pressed to "do their duty," which means service at the front, according to *Stockholms-Tidningen* of September 8. The demand for nurses is urgent, especially on the arctic front, and the Germans want Norwegian nurses to take over the whole of the nursing service there.

According to NPD of July 31, German medicine has made the surprising discovery that a number of dangerous blood diseases can be cured by a systematic denial of vitamins to the patient. This new treatment opens up entirely new perspectives to medical science.

Zora of July 23 states that the incidence of spotted typhus this year is double that of last year. The cases are mainly among Gipsies and are in Deli, Orman, Rhodopi, Yambol and the new territories. The chief of the Public Health Directorate has formed flying detachments for combating the disease.

According to NPD of September 6, exports of the German pharmaceutical industry will probably increase by 36 per cent in 1943 compared with the previous year. German medical preparations are at present being supplied to thirty-two different countries.

ORGANIZATION SECTION

THE VOCATIONAL REHABILITATION ACT AMENDMENTS OF 1943

PREPARED BY THE BUREAU OF LEGAL MEDICINE AND LEGISLATION,
AMERICAN MEDICAL ASSOCIATION

The President on Oct. 9, 1942 sent a special message to the Congress recommending an expanded program for civilian vocational rehabilitation. This recommendation became an actuality with the enactment by the Congress of the Barden-LaFollette bill, so called because of its sponsorship by Representative Barden of North Carolina and Senator LaFollette of Wisconsin. It was approved by the President on July 6, 1943 as Public Law 113, Seventy-Eighth Congress. Now regulations have been promulgated by the Administrator of the Federal Security Agency under which the provisions of the new law will be made effective.[1]

IN GENERAL

Broadly stated, the recently enacted law contemplates a continuation on an expanded basis of the general pattern of a federal-state program for civilian vocational rehabilitation that has been functioning since 1920. An Office of Vocational Rehabilitation has been set up in the Federal Security Agency to administer the program on the federal level. On a state level it will be administered by state boards of vocational education or by state rehabilitation commissions if in existence on July 6 and if such state boards delegate to the commissions the duty of so functioning. If, under the laws of any state, commissions for the blind or other agencies which provide assistance or services for the adult blind are authorized to provide them vocational rehabilitation, then such a procedure will be continued.

The new law places no ceiling on the annual federal sum that can be made available except the most elastic ceiling of "such sums as may be necessary." The term "rehabilitation services" and the term "vocational rehabilitation" are defined to include any services necessary to render a disabled individual fit to engage in a remunerative occupation. Physical restoration of the disabled will constitute a major objective of the expanded program. A state plan to be approvable must provide that vocational rehabilitation will be made available only to classes of employable individuals defined by the Administrator of the Federal Security Agency, including any civil employee of the United States disabled in the performance of his duty and any war disabled civilian whose disability results, without personal misconduct, from disease or injury, or from an aggravation of a preexisting disease or injury, incurred in line of duty while serving at any time after Dec. 6, 1941, and prior to the termination of the war:

1. In the Aircraft Warning Service; or
2. As a member of the Civil Air Patrol; or
3. As a member, in accordance with regulations prescribed by the Director of the Office of Civilian Defense, of the United States Citizens' Defense Corps in the protective services in civilian defense; or
4. As a registered trainee, taking training for such protective services; or
5. As an officer or member of the crew of a vessel owned or chartered by the Maritime Commission or the War Shipping Administration, or operated under charter from such commission or administration.

1. 8 Fed. Reg. 14158 (Oct. 19, 1943).

FEDERAL AID

A state plan having been approved by the Federal Security Administrator, the federal contribution will cover (1) the entire state administrative expenses of the program, (2) the entire cost of rehabilitation of war disabled individuals and (3) one half of the cost of the rehabilitation of other disabled persons. If any state is found by the administrator to have substantially exhausted its fund for necessary expenditures in connection with its rehabilitation plan, he may until July 1, 1945 increase the federal amounts payable to the state.

REMEDIAL TREATMENT OF PHYSICAL HANDICAPS

The House Committee on Education in H. Report No. 426 had this to say about physical restoration of the disabled in justification of the provisions in the new law providing for such restoration:

> With respect to the great inadequacy, or complete lack of, necessary physical restoration under practically all programs, with the exception of New Jersey, Connecticut and Wisconsin, your committee found that under the present program anything done in this field was done without any federal contribution. To put it mildly, the states had been encouraged to retrain a person around a disability, even where it would be more economical and satisfactory to eliminate the handicap itself. Federal funds are available for half the cost of the retraining approach, but no federal funds are at present made available for the more obvious and satisfactory approach.

And again:

> Your committee considered most carefully the testimony of witnesses with respect to physical restoration, and drafted provisions which it is believed will permit the provision of such services, but at the same time limit such services, both as to scope and as to recipients, so as to avoid any possibility of making the vocational rehabilitation grants available for a state health or medical program.
>
> Physical restoration must be particularly emphasized in speedily placing large numbers in productive employment. The testimony made clear that relatively simple operations are all that are needed to make a great many people available for work. Provision of physical restoration by the states under existing law is not forbidden. It has not been provided in the past because of the limitation of funds and the feeling administratively that expenditures for such restoration were not authorized. Hence the present clarification.

The expanded program contemplates that a state plan will provide (1) corrective surgery or therapeutic treatment necessary to correct or substantially modify a physical condition which is static and constitutes a substantial handicap to employment but is of such a nature that such correction or modification should eliminate or substantially reduce such handicap within a reasonable length of time; (2) necessary hospitalization, in no case to exceed ninety days if federal contribution is to be received; (3) such prosthetic devices as are essential to obtaining or retaining employment.

If these services are furnished only to persons "found to require financial assistance with respect thereto," other than war disabled individuals or civilian employees of the government, the federal government will contribute one half of the cost.

FINANCIAL NEED OF REHABILITANT

The regulations issued by the Federal Security Agency point out that the new law does not require a state to condition the acceptance of any individual or the rendition of any service

whatsoever under the plan on the financial need or economic status of the applicant. The state is free to establish and follow its own policies in this respect. A state may not, however, impose a showing of financial need, other than with respect to maintenance, on a war disabled civilian or civil employee of the United States. Furthermore, unless a state plan does impose a financial need requirement on a rehabilitant, with the exceptions noted, who is furnished corrective surgery or therapeutic treatment or hospitalization in connection therewith, the state will be required to assume the full expense with respect to such services.

FEE SCHEDULE FOR MEDICAL AND SURGICAL TREATMENT

A state plan to be approvable must provide such rules, regulations and standards with respect to expenditures on which federal grants are made available as the Administrator of the Federal Security Agency may find reasonable and necessary, including maximum schedules of fees for surgery, therapeutic treatment, hospitalization, medical examinations and for prosthetic devices.

The new regulations provide that, pending a federal determination of such maximum fees and schedules of fees, a state plan should indicate all fee schedules and all arrangements in existence with individuals, agencies or institutions, public or private, affecting the amounts of fees for such treatment and training. Such fees and costs may not, unless previously federally authorized, exceed those paid for similar services in the state by other public agencies such as workmen's compensation, public health, crippled children, public welfare and similar agencies.

FACILITIES MADE AVAILABLE BY FEDERAL GOVERNMENT

Section 5 of the law authorizes the Administrator of the Federal Security Agency to enter into agreements with two or more state vocational boards needing special facilities and services and to furnish such services and facilities on a cost basis. The administrator is authorized to establish the facilities needed.

The new regulations provide that, in order to facilitate equitable and effective application of the foregoing authority, state officials should submit as soon as may be convenient comprehensive lists and evaluations of public and private facilities available to the state for rehabilitation purposes and the area feasibly served thereby, indicating fields essential to a well rounded program of vocational rehabilitation with respect to which individual plans cannot be developed by reason of the lack, remoteness or unavailability of facilities.

In addition, it is suggested that each state board should make recommendations to the federal agency as to the means and methods by which the availability and potentially utilizable facilities can be developed through arrangements with other states for the use of such facilities or conversely as to the possibilities for making facilities available to areas in neighboring states in or near to which such facilities may be located or from the use of which adjoining areas might derive substantial benefit.

ADVISORY COMMITTEES: STATE AND FEDERAL

The regulations provide that a state plan should set up a representative advisory committee. It is recommended that technical committees be formed in the fields of (*a*) medicine and surgery, (*b*) education, general and vocational, and (*c*) vocational guidance, employment and placement of individuals. It is further suggested that a general committee be established which is equally representative of management and labor and which will include, among others, representatives from the workmen's compensation agency, crippled children's agency, state department of welfare or security commission, civic and service organizations interested in the development of the program, as well as representatives from professional fields. In cases involving administration by an agency for the blind, a state plan may provide for a separate advisory committee in relation to the blind.

The Administrator of the Federal Security Agency has announced the appointment of the following national Rehabilitation Advisory Council to advise the Office of Vocational Rehabilitation in connection with the expanded federal-state program:

Claud M. Andrews, president, National Rehabilitation Association, Tallahassee, Fla.

Dr. Roma Cheek, executive secretary, Commission for the Blind, Raleigh, N. C.

Dr. A. W. Dent, president, Dillard University, New Orleans.

Dr. Kendall Emerson, managing director, National Tuberculosis Association, New York.

W. F. Faulkes, chairman, State Rehabilitation Advisory Council, Madison, Wis.

Dr. M. E. Frampton, New York Institute for the Instruction of the Blind, New York.

Miss Bell Greve, executive secretary, Cleveland Association for Crippled and Disabled, Cleveland.

Stanwood L. Hanson, assistant vice president, Liberty Mutual Insurance Company, Boston.

Jay Hormel, president, George A. Hormel and Company, Austin, Minn.

E. Jay Howenstine, executive secretary, National Society for Crippled Children, Elyria, Ohio.

Monsignor John O'Grady, secretary, National Conference of Catholic Charities, Washington, D. C.

Howard Russell, director, American Public Welfare Association, Chicago.

Col. John N. Smith Jr., director, Institute for the Crippled and Disabled, New York.

Dr. George S. Stevenson, Council on Rehabilitation, American Psychiatric Association, New York.

Dr. George D. Stoddard, state commissoiner of education, Albany, N. Y.

Miss Marjorie Taylor, first vice president, National Occupational Therapy Association, Curative Workship, Milwaukee.

Frank G. Thompson, director, State Department of Registration and Education, Springfield, Ill.

Dr. Philip Wilson, New York Society for Relief of the Ruptured and Crippled, New York.

Miss Catherine Worthingham, president, American Association of Physiotherapy, Leland Stanford University, Palo Alto, Calif.

Miss Betty Wright, American Society for the Hard of Hearing, Washington, D. C.

SPECIAL TECHNICAL SUPERVISION; CONSULTANTS

A state plan, the federal regulations suggest, should indicate the arrangements made or that will be made for the competent technical supervision of plan operations in the following respects: medical direction, psychiatric services and training and placement services. If it is not feasible to provide full time staff officials properly qualified from the technical standpoint in these respective fields, a state plan should indicate arrangements for services of properly qualified consultants to be available in the regular course of administration.

STATE LEGISLATION

If any state was unable to comply with the conditions of the new federal law on the date of its enactment, such state may nevertheless obtain the benefits of the law until sixty days after the legislature of such state first meets in due course after such date of enactment, or until the earliest effective date after such sixty days which could be given in such state to legislation passed within such sixty days to secure the benefits of the federal law, whichever is the later. In the meantime, however, a state must comply with the federal law to the extent possible.

DISTRICT OF COLUMBIA

All operations within the District of Columbia pursuant to the new law will be administered by the Division of the Federal Office of Vocational Rehabilitation, known as the District of Columbia Rehabilitation Service. All applicable provisions of the new regulations, including the formulation by the service and submission for approval of a plan for the District, will govern the operations of the service. The service will assume responsibilities with respect to providing rehabilitation services for resident war disabled civilians and employees of the United States disabled while in the performance of duty equivalent to those of the respective states.

OFFICIAL NOTES

MEETING OF COMMITTEE ON POST-WAR MEDICAL SERVICE

The Committee on Postwar Medical Service met in Washington, D. C., on October 15. There were present:

Dr. Roger I. Lee, chairman
Dr. Irvin Abell
Dr. Arthur W. Allen
Lieut. Commander Edward L. Bortz
Dr. Fred A. Coller
Dr. Warren F. Draper
Dr. Morris Fishbein
Dr. Alan Gregg
Dr. James M. Mason
Rear Admiral Dallas G. Sutton
Dr. James A. Paullin
Dr. Walter W. Palmer
Dr. G. Morris Piersol
Dr. Olin West

The meeting began with an extended discussion of various developments and events since the committee's first meeting on June 5 last, and the bearing such events may have on the scope and plan of the committee's services. Within the advisory function which the committee may discharge vis à vis the Board of Trustees, the following subjects were examined and discussed according to a list prepared by the chairman:

1. The appointment of a secretary.

2. Problems centering around the relocation of physicians.

3. Aspects of graduate education and specialist training refresher courses, internships, residencies and so on for men now in military service of the United States when they are returned or returning to civilian status.

4. The problem of serving certain needs of the profession of those foreign countries whose systems of medical education and medical practice will have undergone profound strain by the end of the war.

5. The extent to which the membership of the committee can appropriately be increased.

6. The desirability of securing information from physicians now in military service or parallel circumstances as to their views regarding further training and education and the type of positions wanted when their war services draw to a close.

The action taken may be summarized as follows:

After the appointment of a secretary, various aspects of the location or relocation of medical officers returning from the war were discussed and a subcommittee of Drs. Allen, Piersol and Gregg (chairman) was appointed to report at the next meeting. In the discussion, emphasis fell on the importance of determining the committee's position in this matter promptly and on the unquestionably complicated nature of fitting physicians to appropriate and satisfactory positions quickly and in several thousands.

A subcommittee consisting of Dr. Palmer, chairman, Dr. Coller and Dr. Blake was appointed to study and report on postwar vocational training periods—internships, residencies and training for the specialties—which affect physicians and medical students. The planning in this direction may involve advice to governmental agencies as well as educational institutions.

The placement of returned physicians in residencies will undoubtedly be at best limited, but so important is it to find the largest possible number of opportunities for young men who went into the service without residencies that the attention of all medical schools and hospitals is called to this need. In the case of internships the resources are larger, but so will be the demand.

Of cardinal importance in supplying facts for the use of both the aforenamed committees is the collection of information from physicians in service as to what they want in point of internships, residencies, specialist training, other education, salaried positions, locations or changes of location. Dr. Abell was appointed chairman of a subcommittee with Dr. Mason and Dr. West to assist him in taking the steps necessary to secure an adequate idea of the types and number of needs, as they may be ascertained directly and in the near future, for the committee's guidance.

The committee expressed its sympathetic concern with the needs of the medical profession in the invaded countries. In view of present difficulties in securing adequate information and the present inaccessibility of the United States to most of the European doctors most in need, the committee reserved decision on this matter to a later meeting.

Because of the importance of the Veterans' Bureau Services in many phases of postwar medicine, a motion was unanimously approved to invite the director of the Veterans Bureau to designate a representative as a regular member of the committee.

In answer to the letter of inquiry and application for membership from the Association of Hospital Interns, the committee expressed itself as not prepared at the present time to enlarge its membership, especially since some physicians in military service may be added as representative of that group, in addition to Rear Admiral Sutton and General Rankin.

The meeting adjourned at 3:20 p. m.

ALAN GREGG, M.D., Secretary.

THE A. M. A. MARCH

Familiar strains of catchy march music have identified the American Medical Association-National Broadcasting Company network radio programs since they were first dramatized in 1935. This identification, or musical theme, as it is known in radio circles, was written for the program and copyrighted to assure exclusiveness. It has now been expanded into a march[1] and published as a piano solo.

Subject to appropriate arrangements under the copyright laws, this music can be used to identify radio programs by the medical profession locally.

The use of music in conjunction with radio programs, even when it is only an introductory and closing movement of a few bars, helps to identify the program and establish an appropriate mood. The music of the A. M. A. March has a definite and catchy swing in march tempo, but it also expresses the appropriate dignity of the medical profession.

The writing and publication of this music is one of the many indications of the acceptance by radio of dramatized health education programs such as "Your Health," "Medicine in the News," "Doctors at Work" and "Doctors at War."

1. A. M. A. March, New York, Remick Music Corporation, 50 cents.

MEDICAL LEGISLATION

MEDICAL BILLS IN CONGRESS

Bills Introduced.—H. Res. 328, introduced by Representative Rogers, Massachusetts, requests the President to furnish the House of Representatives with the following information: (1) the number of beds now available in all hospitals under the jurisdiction of the United States or the District of Columbia, or in private institutions under contract with the United States, and the number and type of patients in such hospitals; (2) the number of beds to be available in hospitals now under construction by the United States, together with the approximate dates on which such hospitals will be placed in service; (3) plans for future construction of government hospitals, and (4) the maximum number of war casualties which it is estimated must be hospitalized at any one time.

H. R. 3272, introduced by Representative Clason, Massachusetts, proposes to authorize an appropriation of an amount necessary to provide loans to war service persons to enable them to complete their education. H. R. 3460, introduced by Representative Smith, Wisconsin, proposes to enact a Veterans' Training and Education Act of 1943 under which to provide vocational training and college education for veterans of the second world war.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ALABAMA

Cancer Program Launched.—A recent appropriation by the state legislature makes possible the inauguration of a statewide program of cancer control in Alabama. For the first year $30,000 has been set aside and for the second year $50,000 to finance the project, which will be administered by the state board of health. A cancer control committee has been named by the Medical Association of the State of Alabama to cooperate in the program. The appropriation will enable the active educational program to continue and provides the means of treating indigent patients with cancer who may apply for state aid. According to the state medical journal the program does not anticipate state owned or state operated clinics but will depend on the cooperation of individual hospitals or clinics or private physicians who can group themselves to qualify for receiving state aid patients. Each clinic recognized for such indigent patients will be given such publicity that it will be generally known as a cancer treatment center. All applications for state aid must come through the county health officer, must give the details of the patient's lesion and must be accompanied by a certificate of indigence from the county department of public welfare. Arrangements will be made with cancer clinics as to the remuneration to be allowed for services rendered. The financial arrangements will be patterned after other states that have become well established in cancer control work. The state journal points out that there are only two cancer clinics in Alabama at present recognized for this work but that there are a number of groups of physicians and hospitals already treating cancer with excellent results who can be organized along these lines.

ARIZONA

Personal.—Dr. Edward S. Godfrey Jr., Albany, state health commissioner of New York, was guest of honor at a dinner, September 22, given by the Maricopa County Medical Society, Phoenix.

State Society to Publish Journal.—*Arizona Medicine* has been selected as the name for the new journal to be published by the Arizona State Medical Association. It will be a bimonthly publication, the first issue of which is to appear in January. Dr. Frank J. Milloy has been chosen as editor and Dr. Jesse D. Hamer, both of Phoenix, associate editor. The new journal will have an organization section, of which Dr. Otto E. Utzinger, Ray, president of the state association, will be editor. The *Bulletin* now published by the Arizona group will be discontinued. The decision to publish its own state journal was reached when the group managing *Southwestern Medicine* decided to discontinue it for the duration, the last copy to appear in December. This publication has been the official journal for the Southwestern Medical Association, Arizona State Medical Association, El Paso County Medical Society and the New Mexico Medical Society.

CALIFORNIA

Changes in Hospital Superintendents.—Dr. Burton A. Adams, medical superintendent of the San Diego County General Hospital for four years, has resigned, effective November 1, newspapers reported.——Dr. Austin U. Miller, Porterville, has been named superintendent of the Tulare County General Hospital, Tulare.

Human Plague.—Plague was reported in an 11 year old boy residing on an Indian Reservation in Quartz Valley, Siskiyou County, during the week ended August 28. According to *Public Health Reports* the infection was believed to have been contracted on a hunting trip in the mountains near Fort Jones. One human case of plague was reported in Siskiyou County in November 1942 (terminating fatally on Jan. 10, 1943) and 2 fatal cases were reported in the county in 1941.

Mussel Poisoning — Four Deaths. — The first cases of mussel poisoning that have occurred in the state since 1939 have appeared in Humboldt and Del Norte counties, according to *California's Health*. Twenty-two persons became ill, 4 of whom died. An annual quarantine is established on mussels along the California coast from May 1 to September 30 of each year. The establishment of the quarantine is well known and the persons who were taken ill in this outbreak disregarded the quarantine.

Hearing Conservation Program Started.—Warren H. Gardner, Ph.D., for the past three years consultant in hearing and vision for the Oregon State Board of Health, has been placed in charge of a new hearing conservation program of the state department of public health. Headquarters of Dr. Gardner, whose title is specialist in hearing conservation, will be in San Francisco. The new activity of the state department of public health was set up under recently enacted legislation providing that the department must seek out children who may have hearing handicaps. The program has been placed under the bureau of maternal and child health in order that it may be correlated to the conferences conducted by the bureau where complete physical examinations are given to children of both preschool and school ages. According to *California's Health*, Dr. Gardner has conducted similar activities in Indiana and Iowa. He is president of the American Society for the Hard of Hearing and has recently been made a lay member of the committee on conservation of hearing for the American Academy of Ophthalmology and Otolaryngology.

COLORADO

University News.—Dr. James C. Magee, major general, U. S. Army, formerly surgeon general of the U. S. Army, lectured on tropical medicine before the students of the University of Colorado School of Medicine, Denver, recently. General Magee recently returned from a tour of camps in North Africa.

Club Building for Colorado Physicians in Memory of Dr. Sewall.—The home of Mrs. Isabel J. Sewall, widow of Dr. Henry Sewall, Denver, may be converted into a club building, named for Dr. Sewall, for Colorado physicians and scientists, newspapers reported. Mrs. Sewall's will, filed for probate in the county court, asked that the residence at 1360 Vine Street be used as a club building "with the thought and purpose that this home, so long associated with the name of Dr. Henry Sewall, may continue to be so regarded." Mrs. Sewall left her home to Dr. Cuthbert Powell, Denver, with the request that it be used for the purpose named in the will, according to the Denver *Rocky Mountain News*.

ILLINOIS

Another Bicounty Defense Health Unit.—Alexander and Pulaski counties, recently declared "defense zones for public health purposes," on September 1 combined to form the second locally directed bicounty defense zone health department in Illinois, according to the *Illinois Health Messenger*. The new full time agency, set up by the county authorities of the two counties with the war emergency aid of the Illinois Department of Public Health, is under the supervision of Dr. Donaldson F. Rawlings, with offices in Cairo. Dr. Rawlings' position as health officer of the Lawrence County Defense Zone Health Department, Lawrenceville, has been filled by Dr. Luke W. Frame, formerly health officer of Lauderdale County, Tenn. The first bicounty unit was formed by Fulton and McDonough counties of the thirty-two Illinois counties designated as "health defense counties," sixteen of which have developed full time state aided local health services for the year round scientific control of preventable diseases.

Chicago

Dr. Gellhorn Goes to Minnesota.—Dr. Ernst Gellhorn, professor of physiology, University of Illinois College of Medicine, has taken over a recent appointment as professor of physiology at the University of Minnesota Medical School, Minneapolis, and head of a special unit in neurophysiology for the study of infantile paralysis that the National Foundation for Infantile Paralysis is sponsoring for Minnesota (THE JOURNAL, July 24, p. 883).

KANSAS

Personal.—Dr. Warren F. Bernstorf was recently elected president of the Winfield Board of Education.——Dr. George R. Dean, McPherson, was appointed a member of the Kansas State Board of Registration and Examination, October 6, filling the unexpired term of the late Dr. Omar L. Cox, Iola.——Dr. Ernest J. Beckner, Pratt, has been appointed health officer of Butler County. He succeeds Dr. Samuel N. Mallison.

Course on Medical Protozoology.—On October 27 a course on medical protozoology opened at the University of Kansas, Lawrence, to continue to November 2, under the auspices of the University of Kansas Extension Division. The course is available for laboratory technicians in the state and

consists of study and laboratory work on malaria and its three species; Trypanosoma and Leishmania (the sleeping sickness of Africa and South America); Endamoeba histolytica, intestinal flagellates of man and intestinal ciliates and sporozoa. Miss Mary E. Larson, assistant professor of zoology at Kansas, is directing the course.

KENTUCKY

Society News.—On October 7 Dr. Aura J. Miller spoke before the Transylvania Medical Society in Louisville on "A Common But Seldom Diagnosed Lung Disease."——Dr. John W. Moore presented "Pregnancy Complicated by Bacterial Endocarditis (case report)" before the Louisville Medico-Chirurgical Society, October 8, and Dr. Harry S. Frazier, "Medical Practice During Wartimes"; both are from Louisville.

Personal.—Dr. Oliver P. Miller has been appointed chief medical officer of the Veterans Administration Facility in Lexington, succeeding Dr. Letcher E. Trent, who was transferred to a veteran's hospital at Mendota, Wis.——Dr. Leon A. Beardsley, Ithaca, N. Y., has been appointed health officer of Caldwell, Lyon and Crittenden counties, effective August 24. ——Dr. Ellsworth H. John, Brownsville, has been appointed in charge of the tricounty health unit of Meade, Breckinridge and Hancock counties, with offices in Hardinsburg.

LOUISIANA

Changes at Louisiana.—Recent appointments to the University of Louisiana State University School of Medicine, New Orleans, include that of William L. Williams, Ph.D., New Haven, Conn., to assistant professor of anatomy. Promotions at the medical school include:

Ralph N. Baillif, Ph.D., to assistant professor of anatomy.
Dr. Robert H. Bayley to associate professor of medicine.
Dr. Louis A. Monte to clinical associate professor of medicine.
Dr. Rupert E. Arnell to professor of obstetrics and gynecology.

MAINE

Naturopath Jailed for Illegal Operation.—Carl E. Ahlquist, a Portland naturopath, in October started serving an eleven months jail sentence after the Maine law court had overruled exceptions filed following his conviction on an illegal operation charge at the January superior court term, newspapers reported. The law court ruled that "the record in this case discloses ample and sufficient evidence to prove beyond a reasonable doubt that the respondent, for a required fee," performed an illicit operation. At the court trial in January Ahlquist was found guilty of the charge by a traverse jury and was sentenced to serve eleven months in jail and pay a $1,000 fine by Justice Albert Beliveau. In the trial Ahlquist was charged with an illegal operation on a 21 year old woman and county attorney Richard S. Chapman declared the operation had caused the woman to be ill, "so ill that there were grave doubts she would live."

MICHIGAN

Treatment for People with Defective Hearing.—With the financial assistance of the Mott Foundation a new service has been added to the health program of Hurley Hospital, Flint, for the treatment of persons with defective hearing. The original work in the treatment of middle ear deafness with radium, particularly in children, was done by Dr. Albert C. Furstenberg, dean, University of Michigan Medical School, Ann Arbor, and his staff. The Mott Foundation has financed the purchase of additional radium for Hurley Hospital and acquired the necessary applicators for the work. The Mott Foundation was established several years ago by Mr. Charles S. Mott, Flint, a vice president of the General Motors Corporation. It sponsors various educational projects and outdoor activities. Within the last three years the foundation has financed a tuberculosis case finding program for all senior high school students in Genesee County, the work being carried on with the photoroentgen unit at Hurley Hospital. There is also a fund for work with crippled children to supplement that provided by the state, a project which is also being carried on at Hurley Hospital.

MINNESOTA

New Officers of Northern Minnesota Group.—Dr. Herbert H. Leibold, Parkers Prairie, was elected president of the Northern Minnesota Medical Association at its annual meeting in Duluth, August 29. Dr. Richard Bardon, Duluth, was named vice president and Dr. Richard N. Jones, St. Cloud, was reelected secretary-treasurer. The time and place of the 1944 meeting will be determined at a meeting of the new board early in 1944.

Hospital Planned at Mayo Clinic.—Plans are under way to construct a 1,200 bed hospital to be operated in conjunction with the Mayo Clinic, Rochester, according to *Hospitals*. The proposed construction will be eighteen stories high and cost $6,000,000. It will be built in two units, with construction work starting as soon as materials are available. Twenty operating rooms and the same number of recovery rooms will be built into the third floor. Patients' rooms will extend from the fifth to the eighteenth floor. Both operating and patients' rooms will be furnished with equipment for air sterilization by light.

Corporation Practice Illegal in Minnesota.—Because a corporation cannot practice medicine or dentistry in Minnesota, the Midwestern Agricultural Workers' Health Association, created to provide health services to migratory agricultural workers who could not obtain the specified services from other sources, will not be able to serve migratory workers in Minnesota. The association was incorporated under the state of Indiana and was to serve all the workers in Ohio, Indiana, Iowa, Illinois, Missouri, Wisconsin, Michigan and Minnesota, the states in which these migratory workers are employed who are imported from Jamaica in accordance with an agreement with the U. S. Department of Agriculture. Dr. Franklin S. Crockett, Lafayette, Ind., was elected president of the board of seven directors, three of whom were to be physicians in good standing in their state medical societies. *Minnesota Medicine*, in reporting the situation, states that other arrangements are under consideration to care for these workers.

NEW JERSEY

Society Announces Season's Programs.—The Cumberland County Medical Society opened its 1943 season October 12 with a talk in Bridgeton by Dr. Harry E. Bacon, Philadelphia, on "Diagnosis and Treatment of the More Common Anorectal Affections." Dr. Thaddeus L. Montgomery, Philadelphia, spoke, October 21, on "The Diagnosis and General Management of Ovarian Neoplasms." Subsequent meetings will be addressed by:

Dr. John R. Beardsley, San Diego, What Life Teaches a Physician, November 9.
Dr. Abraham I. Rubenstone, Philadelphia, Diabetes Mellitus, Its Treatment, December 14.
Dr. Robert A. Matthews, Philadelphia, Common Psychosomatic Problems Encountered in General Practice, Feb. 8, 1944.
Dr. William Harvey Perkins, Philadelphia, Medicine, An Applied Science, April 11.
Dr. Temple S. Fay, Philadelphia, Neurological Lesions in Children, June 13.

John Scott Medal Awarded for Work on Swine Influenza.—Dr. Richard E. Shope, Princeton, N. J., a member of the Rockefeller Institute for Medical Research, has been awarded the John Scott Medal and "premium" of $1,000 by the city of Philadelphia through its board of directors of City Trusts, for his "discovery of the complex etiology of swine influenza." Dr. Shope graduated at the State University of Iowa College of Medicine, Iowa City, in 1924. He is 41 years of age. Mr. John Scott, chemist of Edinburgh, in 1816 bequeathed to the city of Philadelphia the sum of $4,000, the income of which was to be "laid out in premiums to be distributed among ingenious men and women who made useful inventions." Reports concerning the award indicate that little is known concerning the donor or why he selected Philadelphia. The fund has been managed in turn by the city councils, the Franklin Institute and finally by the directors of City Trusts. It has grown to more than $100,000.

NEW YORK

Lectures on the Biology of Cancer.—A course of practical teaching lectures on the "Biology of Cancer" was to begin during October for biology teachers in public and private schools and colleges throughout Westchester County. The course will consist of four to six lectures by Clarence R. Halter, Ph.D., assistant biologist at Memorial Hospital for the Treatment of Cancer and Allied Diseases, New York, under the auspices of the research council of the Westchester Cancer Committee.

Meeting on Tumors.—There are now 179 cancer patients on the ten year survival list of Rochester hospitals, according to a report presented by the executive secretary of the New York State Committee of the American Society for the Control of Cancer at a meeting in Rochester, October 5. Seventy-one new five year survivals were reported, bringing the total of five year survivals up to 673. A scientific program was conducted by Dr. Andrew H. Dowdy, associate professor of radiology, University of Rochester School of Medicine and Dentistry, and director of the Tumor Clinic of the Strong Memorial Hospital, where the meeting was held. Dr. Karl M. Wilson, professor of obstetrics and gynecology, University of Rochester School

of Medicine and Dentistry, reported 5 cases of chorionepithelioma seen in the gynecologic service since the opening of the hospital in 1926, 2 of which have reached the five year survival point. Dr. Clyde A. Heatly, associate professor of otorhinolaryngology and bronchoscopy, and Dr. Dowdy presented 8 patients who had been treated with laryngofissure, laryngectomy and irradiation for carcinoma of the larynx. Dr. John M. Swan, Rochester, is executive secretary of the New York State Committee.

New York City

Cassius Watson Retires as Medical Director of American T. and T.—Dr. Cassius H. Watson, for twenty-eight years medical director of the American Telephone and Telegraph Company, retired on October 1. He has been succeeded by Dr. Melville H. Manson, formerly medical director of the Bell Telephone Laboratories and since 1942 medical director of the New York Telephone Company.

Hospital Needs Interns.—The Hospital for Joint Diseases announces sixteen places available on its general rotating service for nine months internship. One half of the number appointed may be permitted to continue for another nine months as junior residents, and thereafter one half of the number of junior residents may be continued for another nine months as senior residents. Three interns will begin on April 1, 1944, four on July 1 and four on October 1. Five interns will begin on Jan. 1, 1945. The hospital provides maintenance, uniforms and a stipend of $15 a month. Applications should be addressed to the director, Hospital for Joint Diseases, 1919 Madison Avenue, New York 35.

Salvage Potential Manpower Among Tuberculous for War Production.—The New York Tuberculosis and Health Association has expanded its rehabilitation service for the guidance of recovered tuberculosis patients by appointing personnel to project the program, which has for one of its objectives the salvage of potential manpower among the tuberculous for war production. The program includes guidance and counsel to the patient in order that he may find a job consistent with his ability to work and the promotional aspect of rehabilitation. The objective of the latter is to educate medical, lay and employer groups regarding the employment possibilities of former tuberculous patients, the establishment of educational facilities for patients still in hospitals and guidance to hospital personnel in planning or expanding such educational facilities. Bernard S. Coleman, S.B., secretary of the tuberculosis committee of the association, is directing the program.

American-Soviet Scientific Meeting.—The National Council of American-Soviet Friendship will sponsor a meeting at the Hotel New Yorker and Madison Square Garden, November 6-8. The first session Saturday will be on "Planning a Postwar Reconstruction in the U. S. A. and the U. S. S. R." On Sunday panels will be held on "Soviet Science and Technology" and on "Public Health and Wartime Medicine in the U. S. S. R.," the latter panel to be held under the auspices of the American-Soviet Medical Society. The congress, sponsored by leading scientists throughout the country, has as its honorary chairmen Dr. Walter B. Cannon, Cambridge, Mass.; Ernest O. Lawrence, Sc.D., Berkeley, Calif., and Gilbert N. Lewis, Ph.D., dean of the College of Chemistry at the University of California, Berkeley. Among the speakers will be:

Leslie C. Dunn, Sc.D., Russian Research in the Biological Sciences.
C.-E. A. Winslow, Dr.P.H., New Haven, Conn., Public Health in the Soviet Union.
Dr. Vladimir V. Lebedenko, Russian Red Cross representative in the United States, Russian Advances in Military Medicine.

Harold C. Urey, Sc.D., has accepted the chairmanship of the panel on Soviet Science and Technology.

Two Cents a Day Plan Offered by Hospital Service.—In an effort to bring additional medical care and hospitalization to the lower income group, the Associated Hospital Service of New York plans to introduce a two cents a day plan to supplement the three cents a day plan. Ward accommodations, instead of the semiprivate rooms available under the existing program, will account for the difference in price, according to the New York *Times*. Ninety-two hospitals had agreed to give this new service on October 15 but, it was stated, between forty and fifty more were needed before the program could go into operation. Rates to the public will be about 20 per cent lower than those now in effect; for an individual they will be about 56 cents a month and for a family $1.50. Under the new contract, which has been cleared by the state insurance department, subscribers will be entitled to all ward services including room and board, use of the operating room, x-ray facilities, medication, drugs and dressings. As in the three cents a day plan there will be a twenty-one day benefit period. If necessary, the subscriber will obtain a 50 per cent discount for an additional ninety day hospital stay. To receive these accommodations the subscriber must be eligible for admission to the ward under the rules of the individual hospitals. The patients who cannot be admitted to the ward will be entitled to the use of a semiprivate room on payment of a small fee to the hospital, the *Times* reported. Maternity benefits will be provided only under the family contract. These will be limited to $4 a day for ten days in normal cases. Should complications develop in maternity cases the subscriber will receive full benefits.

Advances in Medicine.—A series of lectures on the Advances in Medicine will open at Mount Sinai Hospital, November 24, with members of the staff participating. The program is as follows:

Dr. Robert T. Frank, Recent Advances in Endocrine Therapy, November 24.
Dr. Marcy L. Susman, Recent Advances in the Diagnosis of Congenital Heart Disease, December 8.
Dr. Gregory Shwartzman, Recent Advances in Bacteriology and Virus Research with Special Reference to Electron Microscopy, December 22.
Dr. Israel S. Wechsler, Recent Advances in Neuropsychiatry with Special Reference to the Electroencephalogram and the Shock Treatment of Psychoses, January 5.
Dr. John H. Garlock, Recent Advances in the Surgical Treatment of Diseases of the Esophagus, January 19.
Dr. Burrill B. Crohn, Recent Advances in Gastritis and Ileitis, February 2.
Dr. Asher Winkelstein, Recent Advances in Ulcerative Colitis, February 2.
Dr. Ira Cohen, Recent Advances in the Diagnosis and Treatment of Intracranial Lesions, February 16.
Dr. Ralph Colp, Recent Advances in the Surgical Treatment of Gastric, Duodenal and Jejunal Ulceration, March 1.
Dr. Arthur M. Fishberg, Recent Advances in Hypertension, March 15.
Dr. Reuben Ottenberg, Recent Advances in Chemotherapy, March 29.
Dr. Louis J. Soffer, Recent Advances in the Physiology of the Thyroid and Adrenal, April 5.
Dr. Paul Klemperer, Recent Advances in Cellular Pathology, April 19.
Dr. Nathan Rosenthal, Recent Advances in the Study of the Hemolytic Anemias, April 26.
Dr. Harold Neuhof, Recent Advances in the Problem of Pulmonary Embolization, May 3.

PENNSYLVANIA

Physicians Honored.—Four physicians were presented with testimonial certificates indicating the completion of fifty years in practice of medicine at a meeting of the Second Councilor District of the State Medical Society, Reading, September 8. The physicians are Drs. George C. Webster, Chester; Harvey F. Scholl, Prospect Park; Charles H. Schoff, Media, and George F. Seiberling, Allentown.

Child Care Centers.—On August 1 six child care centers had been opened in Pennsylvania, one each in Darby, Erie, Williamsport, Rankin, York and Pittsburgh. Supported by federal funds, these centers are designed to provide certain hours of care for children whose ages range from 2 to 14. The centers provide care to children of parents only during "employment rendering service to the community or the nation." Other centers are being developed throughout the state.

State Assumes Control of Scranton Hospital.—The state of Pennsylvania will direct the Hillside Home and Hospital for Mental Diseases, Clarks Summit, as a state institution, in accordance with the recent transfer of control from the Lackawanna County Institution District to the commonwealth, newspapers report. The transfer was unsuccessfully opposed by the Lackawanna County commissioners. Governor Edward Martin has appointed new trustees to control the institution and Dr. Emlyn T. Davies, Old Forge, former state representative, has been named acting superintendent.

Philadelphia

Annual Alpha Omega Alpha Lecture.—Dr. Russell L. F. Cecil, New York, will present the annual lecture of the Jefferson Chapter of Alpha Omega Alpha at the Jefferson Medical College, November 11, on "Rheumatoid Arthritis."

Voluntary Contributions Finance Bulletin for Service Men.—Voluntary contributions from individuals, physicians and friends of the University of Pennsylvania Hospital are financing a weekly bulletin mailed each week to former staff members of the hospital serving in the armed services. The bulletin has grown from an initial three issue release to four hundred weekly copies, first published in June 1942 running on an average of four mimeographed pages. Originally Dr. Bernard I. Comroe and his wife financed the endeavor, but such interest has attached itself to the little paper that others seek to maintain at least one issue. Credit is given to the contributor in each issue. The bulletin contains news concerning the University of Pennsylvania School of Medicine and Hospital, including results of scientific work, and personal news of men at home and in the service when released by censorship. Dr. Comroe, senior ward physician at the hospital, associate in medicine at the medical school and chief of the medical division of the student health service, prepares the material with the assistance of all voluntary contributors.

SOUTH CAROLINA

Personal.—Dr. Dargan Strother Pope, Columbia, has been appointed a member of the board of trustees of the Medical College of the State of South Carolina, Charleston, to fill the vacancy created by the death of Dr. Thomas H. Pope, Newberry.

Physician Sentenced on Mail Fraud Charge.—Dr. Benjamin I. Siegel, Rock Hill, was sentenced to three years in federal prison in the closing case of federal court in Rock Hill, September 8, on a charge of using the mails to defraud, according to the Charlotte *Observer*. Dr. Siegel is alleged to have charged the beneficial fund of the Rock Hill Printing and Finishing Company with services to employees. He mailed such bills and received payment also through the mails, the government charged. The physician had first entered a plea of not guilty but later changed his plea to guilty, it was stated.

TEXAS

New Health Unit.—A new health department has been set up in Galveston County with headquarters in LaMarque. Dr. Edward M. Barnes, formerly of Tampa, Fla., is the new director of health.

State Psychopathic Hospital Closed Temporarily.—The Galveston State Psychopathic Hospital has been closed temporarily for repairs. Dr. David Wade, acting superintendent, has been assigned to Austin in the office of the state board of control to serve as clinical director of state hospitals.

Motion Picture Lending Library Established.—The State Medical Association of Texas has established a motion picture lending library. There will be a charge to cover the cost of transportation and handling, and borrowers will be required to pay the costs of damages to films while in their possession. The library now has a number of films which have been lent out by a number of firms for relending purposes.

UTAH

Dr. Wintrobe Named Professor of Internal Medicine.—Dr. Maxwell Myer Wintrobe, formerly associate professor at the Johns Hopkins University School of Medicine, Baltimore, has been appointed professor and head of the department of internal medicine, University of Utah School of Medicine, Salt Lake City.

VIRGINIA

Portrait of Dr. Leigh.—A portrait of the late Dr. Southgate Leigh, executed by W. S. Harney, was unveiled on June 10 in the staff conference room of the Leigh Memorial Hospital, Norfolk. The portrait was the gift of the Sarah Leigh Nurses' Association. Dr. Leigh, who died on March 5, 1936, founded the hospital in 1903.

Graduate Course in Otolaryngology.—The eighteenth annual spring graduate course on otolaryngology and ophthalmology will be given at the Gill Memorial Eye, Ear and Throat Hospital, Roanoke, for a week beginning on April 4. The courses are available only to physicians specializing exclusively with the eye, ear, nose and throat.

GENERAL

Association for Research in Nervous and Mental Disease.—"Trauma of the Central Nervous System" will be the theme of the annual meeting of the Association for Research in Nervous and Mental Disease at the Waldorf Astoria Hotel, New York, December 17-18. Dr. Jefferson Browder, Brooklyn, is president of the association and Dr. Thomas E. Bamford Jr., 115 East 82d Street, New York 28, secretary-treasurer.

Ear and Throat Meeting.—The American Otorhinologic Society for the Advancement of Plastic and Reconstructive Surgery will hold its first annual meeting in New York on November 12 under the presidency of Dr. Romeo A. Luongo, Philadelphia. A clinic and business meeting will be held at the Manhattan General Hospital and a scientific meeting in the New York Academy of Medicine. The speakers at the latter will include:

Dr. Samuel Fomon, New York, The Role of Plastic Surgery in the Field of Otolaryngology.
Col. Samuel J. Kopetzky, M. C., A. U. S., subject not announced.
Dr. Alfred Schattner, New York, Report of Isograph Transplants in Identical Twins.
Dr. Arthur W. Proetz, St. Louis, Physiology of the Nose.

College of Chest Physicians.—The American College of Chest Physicians, Southern Chapter, will meet at the Hotel Gibson, Cincinnati, November 16-18, during the session of the Southern Medical Association. Speakers at a luncheon session sponsored by the Ohio State chapter of the college of chest physicians will be Drs. William A. Hudson and David S. Brachman, Detroit, on "A Study of Rejectees for Thoracic Abnormalities." A dinner meeting will be addressed by Dr. J. Rodriguez Pastor, San Juan, P. R., on "The Tuberculosis Problem in Puerto Rico." Other speakers will include:

Dr. Arnold S. Anderson, St. Petersburg, Fla., Chest Diseases in the Aged.
Dr. Jesse D. Riley, State Sanatorium, Ark., The Relative Importance of the Anatomic and Physiologic Concept in Tuberculosis.
Lieut. Col. Carl W. Tempel, M. C., U. S. Army, New Growths of the Chest.
Col. Arden Freer, M. C., U. S. Army, The Occurrence of Pulmonary Tuberculosis in Supposedly Screened Selectees.
Lieut. Comdr. Dean F. Smiley (MC), U. S. Naval Reserve, Tuberculosis as a Navy Problem.
Dr. Chester A. Stewart, New Orleans, Tuberculosis Among Children and Young Adults.
Dr. Evarts A. Graham, St. Louis, The Indications for Total Pneumonectomy.
Drs. Paul H. Holinger and Ralph G. Rigby, Chicago, Bronchoscopic Kodachrome Motion Pictures of Tracheal and Bronchial Tuberculosis.
Dr. Richard M. Davison, Chicago, Lung Resection in Chronic Pulmonary Diseases.

Medical Panel Created by Automotive Council.—A medical panel has been created by the Automotive Council for War Production to make available to all automotive companies the experience and knowledge developed in the medical departments of the leading companies, to the end that the whole industry may have the benefit of information available on general or specific questions of industrial health. At its organization meeting, August 25, Dr. John J. Pendergast Jr., medical director, Chrysler Corporation, was elected chairman. Members of the panel, all heads of the medical staffs of their companies, are Drs. Archibald W. George, Packard Motor Car Company (Joseph L. Zemens, alternate); Frank J. Jarzynka, Bohn Aluminum & Brass Manufacturing Corporation; William T. Krebs, Hudson Motor Car Company; Harley L. Krieger, Ford Motor Company (Howard P. Staub, alternate); Clarence H. Kuhlmann, Cleveland Graphite Bronze Company; Clarence D. Selby, General Motors Corporation, and Dr. Prendergast, Chrysler Corporation (Stuart F. Meek, alternate), all of Detroit. Harlan V. Hadley, associate manager of the Council's Manpower Division, is secretary of the group. At present consisting of seven members, the panel is to be expanded to twelve members, with the panel itself nominating and electing new members. The panel has entire freedom to limit or expand its activities, subject only to the provision that such activities must be in the national interest of "expediting the output of armaments for the fighting forces." It is planned to hold four meetings of the panel annually in the hospital offices of the members to discuss and act on medical questions of industry-wide import. It is also planned to maintain the complete anonymity of the source of inquiries and the source of replies to such inquiries. All questions will be addressed to the secretary, Harlan V. Hadley, who will forward them with all signs of identification removed to all members of the panel. Members in turn submit their replies to the secretary, who forwards them, again with all signs of identity removed, on instruction from the chairman, to the member of the panel designated to write a composite report. The composite report is then supplied to the source of the question over the secretary's name and with the name of the doctor who wrote it withheld. The policy will be to answer inquiries on a purely scientific basis rather than from a standpoint of the individual practice of the doctor's company. Another policy will be that the chairman may answer inquiries as to medical standards by citing the standards created by recognized medical groups, when available, with or without modification as each situation requires. This modification principle is shown in the government's standard for the employment of pregnant women. Where the government suggests a minimum of six weeks' leave for the woman before delivery and a minimum of two months' leave after delivery, the panel feels that she should leave her employment on or about the third or fourth month of gestation, depending on her specific condition, and not return until she is three months post partum. Other questions before the panel are the employment of partially disabled war veterans or other physically handicapped persons, dermatitis, the general use of vitamin pills, the relief of overtension resulting from fatigue, preemployment, physical examinations and periodic continuing examinations of food handlers.

Report of Rheumatic Fever Conference.—On October 5, 6 and 7 the Children's Bureau of the U. S. Department of Labor held a national conference in Washington, D. C., on rheumatic fever. Since 1939 a portion of the federal funds appropriated annually for crippled children's services has been used for the development of state services for children with rheumatic fever and heart disease. Fourteen states now have

such programs in operation, and several additional states have completed plans for the development of these services. Attending the conference were representatives from state agencies, members of the Children's Bureau Advisory Committee, experts in the field of clinical investigation pertaining to the problem of rheumatic fever, and representatives of numerous lay and professional organizations concerned with the health and welfare of the rheumatic child. At the opening session of the conference Col. Leonard G. Rowntree, M. R. C., chief, Medical Division, Selective Service System, pointed out that rheumatic heart disease is responsible for thousands of rejections from the armed forces. Among 13,000,000 men examined, over 230,000 were classified as 4 F because of cardiovascular disease. Dr. Rowntree estimated on the basis studies made by the National Research Council that nearly half of these cardiovascular defects were caused by rheumatic fever. Brig. Gen. Hugh J. Morgan, A. U. S., medical consultant, Surgeon General's Office, reviewed the current experience in the Army in dealing with the problem of rheumatic fever, indicating that the problem is essentially the same in the Army as in the civilian population. He urged that civilian health authorities follow the lead of the Army in taking vigorous steps to combat this disease. Lieut. Comdr. Alvin F. Coburn (MC), U. S. Naval Reserve, stated that conditions in navy training camps are conducive to the development of rheumatic fever.

The prophylactic use of the sulfonamides in the prevention of recurrent attacks of streptococcic infections in rheumatic patients was considered at a round table discussion. Participating in the discussion were Dr. Homer F. Swift, New York; Commander Coburn; Dr. Ann G. Kuttner, Boston; Dr. Arild E. Hansen, Minneapolis; Dr. Katharine G. Dodge, New York; Major William H. Button, M. C., A. U. S.; Dr. Caroline C. B. Thomas, Baltimore, and Dr. Caroline A. Chandler, Washington. There was general agreement among the discussers that the sulfonamides have been proved to be effective in the prevention of recurrent attacks of rheumatic fever. Warning was given against the indiscriminate use of these drugs without close medical supervision. The use of the drugs as a prophylactic measure for rheumatic patients should be considered only as an adjunct to a general regimen designed to provide adequate health supervision of the rheumatic child. At other sessions of the conference emphasis was placed on the importance of early diagnosis during the initial attack of the disease, referral of patients to special diagnostic clinics, examination of siblings of rheumatic children, provisions for institutional care during the period of active infection, educational and recreational activities for children confined to bed for long periods of time, special educational services for children with heart disease, and coordination of community facilities and services for the care and management of the rheumatic child. Those attending the conference agreed that rheumatic fever represents an important public health problem in the United States but that facilities and services have not been developed to the point where the needs of children afflicted with this disease are being adequately met. Many members of the conference pointed to the need for further opportunities for local physicians to become more fully acquainted with the disease and with the methods for the care and management of the rheumatic child. It was apparent that the problems of children afflicted with rheumatic fever cannot be met by the services of any single individual or agency for the close cooperation of physicians, nurses, social workers, educators and others engaged in related fields. Dr. Thomas Duckett Jones, Boston, in summing up the conference at the closing session called attention to the progress that had been made in many states during the past three years in the care of the rheumatic child through the development of the state programs and pointed to the need for the extension of existing programs and for the development of similar services in other states.

LATIN AMERICA

Cancer Congress. — The Primer Congreso Mexicano de Cancer and Segunda Semana Medica de Occidente will be held in Guadalajara, Jalisco, Mexico, during the first week of November. Among the invited speakers are Dr. Charles W. Mayo, Rochester, Capt. Waltman Walters (MC), U. S. Naval Reserve, Lieut. Col. James T. Priestley, M. C., A. U. S., Dr. Howard K. Gray, Rochester, Dr. Angel H. Roffo, Buenos Aires, Drs. Luis Pariñas and Juan Llambes, Cuba, Dr. José Gómez Márquez, Honduras, Dr. Robert Gutiérrez, New York, Dr. Ramón Castroviejo, New York, Dr. Charles Pierre L. Mathé, San Francisco, Dr. Arthur Steindler, Iowa City, Dr. Joseph M. Hill, Dr. Alfred I. Folsom, Dr. Charles L. Martin, Sol Haberman, Ph.D., Dr. John D. Singleton, Dr. Howard J. Scott, Dr. John V. Goode, all of Dallas, Texas, Dr. Juan Carlos Oreggia, Montevideo, Uruguay, Spencer R. Atkinson, D.D.S., Pasadena, Calif., Ben Robinson, D.D.S., Baltimore, Dr. Julio Fazzio Calmet, Montevideo, Dr. Ricerio V. Canzani, Buenos Aires, Dr. Melvin S. Henderson, Rochester, Dr. Alejandro Wallace, Los Angeles, Dr. Rudolph Matas, New Orleans, Dr. Manuel M. Garcia, New Orleans, Dr. Enrique J. Cervantes, New York, Dr. Alton Ochsner, New Orleans, Dr. Oscar Mercier, Montreal, Canada, Dr. Verne C. Hunt, Los Angeles, and Carl Voegtlin, Ph.D., Washington, D. C. Dr. Ochsner will represent the American Medical Association at the congress.

Government Services

Dr. Foard Placed in Charge of Western Public Health District

Dr. Fred T. Foard, surgeon, U. S. Public Health Service, has been assigned as medical director for the Western district of the public health service, which includes the states of Idaho, Utah, New Mexico, Colorado and Texas, with central headquarters in Denver.

Civilian Health Good, Says Report

Statistics of the U. S. Public Health Service show that the lowest death rate on record, 10.3 per thousand, was recorded in 1942, according to a report released by the Office of War Information. The birth rate was 20.7 in 1942 as compared with 18.7 per thousand in 1941. The maternal mortality rate dropped for the thirteenth consecutive year to about three deaths per thousand live births in 1942. Infant mortality also continued to drop. For the first six months of 1943, however, statistics indicate slightly less favorable conditions as reflected by communicable disease reports and by estimated death rates. With the exception of meningococcic meningitis (cerebrospinal fever), poliomyelitis and the dysenteries, the incidence of communicable diseases reported to the public health service during the first half of 1943 is below or approximately the same as that for the corresponding period of 1942. Cerebrospinal meningitis, which began to increase during 1942 and developed into incipient epidemic proportions toward the end of the year, has remained at a high level so far this year in spite of a seasonal decline. Up to the week ended August 14 a total of 13,368 cases had been reported. This is a larger number of cases than has been reported for any entire year since 1914, when collection of these reports was begun. The largest number of cases for any year for that period was 10,551, reported in 1929. The incidence of poliomyelitis is above that of any year since 1934. The total number of cases this year, as of August 21, is 4,059, which compares with 1,505 for the same period last year and a five year median of 2,072 cases. In the week ended August 21, the last for which complete figures were available, the total was 747 cases, an increase of 201 cases over the report for the previous week. Chief centers of infantile paralysis are California, Kansas, Illinois and Texas, with cases also in Oklahoma, New York and Connecticut. There has been an increase of dysentery during the first half of the current year. About twice as many cases had been reported up to July 24 as were reported for the same period last year. This increase is probably due in part to the lack of sanitary precautions in eating establishments and carelessness among food handlers. Preliminary figures indicate a low rate in 1943 for typhoid. Up to July 24 only 2,424 cases had been reported in the United States as compared with 3,444 for the same period last year. While preliminary mortality figures through May of this year indicate a slightly less favorable death rate than last year, no significant increase has been recorded. The provisional annual death rate for the first five months of 1943 was 11.2 per thousand of population, or 0.31 higher than the rate for the same period in 1942. The death rate for the entire year 1942 was only 10.3 per thousand of population, the lowest on record. The increase in the rate during 1943 apparently is due principally to the excess in death from cardiovascular-renal diseases, although increases in the deaths from some of the childhood diseases and from the cerebrospinal fever have probably also been factors, although less important numerically. According to the report, it is interesting to note that there has been no indication of increased mortality from respiratory tuberculosis in this country since the beginning of the war. In fact, the death rate from this cause has been lower than in 1939 and 1940.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Sept. 10, 1943.

British Medical Students Association

Formation of the British Medical Students Association means that the voice of the medical student is heard for the first time in medical affairs. At first the movement was supported by only a small group of students, but it grew quickly, and within a year the association was requested by the medical planning commission of the British Medical Association to submit a memorandum on medical education. It now has a membership of over eight thousand; almost all the medical schools and teaching hospitals in the British Isles have joined. A congress of students, the first of its kind, was held in December and was attended by five hundred students from medical schools all over the country. A memorandum on medical education, based on evidence submitted by fifteen schools, was drawn up. Among its recommendations were the following: 1. Medical students should be drawn from all sections of the community without reference to financial means or sex. 2. They should have the opportunity of working within a university and not in isolated medical schools, to prevent too early dissociation from other students. 3. Newly qualified doctors should be compelled to serve a period of hospital appointment before license to practice is granted.

Another important memorandum, on student health, has been drawn up by the association. Various schemes have been tried in British universities, but none have proved satisfactory. All students, and particularly medical students, tend to live in unhealthful surroundings. The extension of university hostels and approved lodgings is regarded as the first step in improvement. Routine x-ray examination of the chest is also recommended. Since health is a problem that concerns all students, the British Medical Students Association is cooperating in the formation of this program with the National Union of Students and the British Dental Students Association. A course of eight lectures by eminent authorities on various aspects of the war has been arranged in London.

At nearly all the medical schools meetings have been held to discuss the Beveridge scheme, which on the whole is supported, though there is wide disagreement as to details. A resolution urging the government to implement the Beveridge principles without delay was carried by 34 votes to 3 at a committee meeting.

The Army Blood Transfusion Service

The Army Blood Transfusion Service has a panel of 320,000 donors. Of this number between 3,000 and 4,000 have made donations each week for some time. This service operates in an area covering practically the whole of the south of England. Major campaigns to enroll volunteers are conducted six times a year, but minor campaigns are in continuous operation in factories, villages and small towns in a definite cycle of visits. Donations are taken by fifteen mobile teams, each having a medical officer. At headquarters the blood group of each donor is ascertained and recorded. The blood of group O, from the "universal donor," is pooled and used to make fluid plasma, of which 58,932 pints have already been made for military use at home or overseas in temperate climates. For tropical and subtropical countries dried plasma with distilled water for reconstitution is supplied. Whole blood is exported to any theater of war within air distance from England, and blood banks are maintained in important civil and air force centers. Large insulated boxes with ice inserts keep the blood at 4 C. for eight hours. Overseas it is kept in cool mobile refrigerators and distributed to field transfusion units from the base unit. If whole blood remains unused after three or four weeks it is converted into plasma.

All transfusion fluids, including crystalloid solutions, are accompanied by administration apparatus in sterilized tins ready for immediate use. Sets for blood taking are also issued with supplies of dried serum for blood grouping. Special boxes of equipment are issued for the use of military hospitals, field ambulances, troop ships and air borne medical units, to which they are dropped by parachute.

The technical staff of the Army Blood Transfusion Service is under the direction of L. E. H. Whitby. It is drawn almost entirely from the laboratory staff of the Royal College of Surgeons and the Middlesex Hospital. It trains special transfusion units for service overseas and instructs all ranks of the Army Medical Corps in resuscitation work. The British army differs from all others in having a distinct transfusion service with its own source of supply and specially trained mobile resuscitation teams. In every theater of war there is a base transfusion unit, which, linked with the home service, is able to exploit local resources and thus supplement the supplies obtained from home.

New Zealand Immigration: Admission of European War Orphans

In reply to the suggestion that war orphans should be received in New Zealand, Prime Minister Fraser replied that there could be no argument about the need for more population there. The government's first concern was the rehabilitation of the men fighting overseas, he indicated, but that did not preclude attention to immigration. New Zealand could take her share in helping the homeless children of the world—the government had already discussed with the Polish consul general the question of taking Polish children. Immigration questions would also be taken up with British authorities, the prime minister stated. Many British soldiers in North Africa have indicated their intention to go to New Zealand after the war, and New Zealand wishes as far as possible to keep the country British.

American Psychiatrists Entertained

Psychiatrists of the United States and Canadian forces in this country were entertained by the London County Council at Sutton Emergency Hospital. Short papers were read on Rehabilitation of the Neurotic (Dr. Minski), Psychopathic Personalities (Colonel Petrie), Recognition of the Neurotic in the Services (Dr. Slater) and Psychic Treatment in Psychiatry (Dr. Sargant). A demonstration on the electroencephalogram was given by Dr. Hill, a demonstration of electroconvulsive therapy by Dr. Sands, and visits were made to the occupational workshops. Colonel Thompson and Colonel Van Nostrand returned thanks on behalf of the United States and Canadian psychiatrists.

Writing on Pigmented Skins

When a skin pencil is used on African natives—for instance to note the administration of morphine—the writing is almost invisible. The same applies to the darker races of India. The *Army Medical Department Bulletin* reports that an officer in West Africa has overcome the difficulty by means of a thick emulsion prepared from acacia and any white powder, such as zinc oxide, mixed in hot water. The emulsion can be conveniently kept in a half ounce bottle, from which it can be applied by means of a small pointed stick transfixing the cork.

The Work of the American Red Cross in Britain

Mr. Norman H. Davis, chairman of the American Red Cross, who has come here to confer with Mr. Harvey Gibson, American Red Cross commissioner in this country, and with service leaders on future plans to meet conditions when the United States forces move into other areas, has paid a tribute to the facilities provided for the American forces by various clubs and field and hospital organizations. American Red Cross activities cover operations in the Southwest Pacific, India, North Africa, Iceland and Alaska and will follow as quickly as possible in any new theater of war. In this war Red Cross activities have developed somewhat along new lines, particularly in club and welfare work. In Britain eighty American clubs are already open and seventy others are being formed. They include service clubs which provide the equivalent of homes to Americans on leave in our cities and towns. Other clubs offer all these facilities except sleeping rooms and meals.

Another type of club is the "clubmobile," or club on wheels, made from converted omnibuses. It carries American newspapers and magazines, writing materials, American doughnuts, coffee, cigarets and chewing gum to men on duty in isolated camps and air bases. Each clubmobile is staffed by three American girls and gives performances of the latest phonograph records from loud speakers on the roof. Each is convertible into an ambulance to carry 10 stretcher cases.

To most American army hospitals are assigned welfare services to build up and sustain the morale of patients by providing wholesome relaxation and instruction in hobbies, arts and crafts. As to the Red Cross blood transfusion work, the surgeon general of the United States Army, who was in the Tunis campaign, told Mr. Davis that as a result of the use of dried blood plasma the mortality of casualties had been reduced from 15 to 2.5 per cent. About 15,000 people are working for the American Red Cross in Britain; half of these are volunteers, and the large majority are British.

Ophthalmologic Research at Oxford

The provision and equipment of laboratories, lecture rooms, a library and a museum for ophthalmic research at Oxford University is part of an ambitious scheme to be carried out in connection with the rebuilding of the Oxford Eye Hospital, which will be undertaken at the end of the war. Salaries will be provided for full time and part time research workers, teachers and technicians. The costs of research looking toward the prevention of blindness, improved treatment of eye disease and promotion of a higher standard of visual function throughout the country will be defrayed. An important objective for the proposed department is the discovery of the safest antibacterial drugs for ophthalmic use. The extreme delicacy of the eye is the governing consideration, as all the ordinary antiseptics are poisons, and further investigation will need contributions not only from ophthalmologic but from bacteriologic, mycologic and chemical sources. The most promising substance found so far is penicillin, knowledge of which is derived largely from work done in an Oxford laboratory. Statistics show that the risk of failure of vision falls increasingly on those in middle life. In 1941, out of a total blind population of 74,000 in England and Wales 63,000 were persons over the age of 40 years. The cost of the proposed scheme is estimated at $1,000,000, for which an appeal is being made.

Library Difficulties After the War

In a letter to the *Lancet* Mr. C. C. Barnard, librarian of the London School of Hygiene and Tropical Medicine, states that after this war, even more than after the last, libraries will be faced with the problem of filling gaps in their sets of periodicals not only because of their inability to obtain journals from enemy and enemy occupied countries during the war but also because of losses at sea and destruction by air raids over this country. To prevent an unseemly squabble by libraries for volumes limited in supply, he advocates decisions on a national scale by an impartial body on the allotment of volumes. This should form part of a much larger scheme whereby the present holdings of learned periodicals would be surveyed and the needs of research in the various centers of learning assessed, regard being paid to specialization in various institutions. Interchanges of stock could be arranged to insure complete sets in libraries where they are most needed. The obvious body to undertake this program is the Library Association.

Before the war two such schemes were being prepared—in the fields of German studies and of medicine. Only when this work has been completed will it be possible to compile a satisfactory union catalogue of periodicals in British libraries, which is much needed to supersede the present incomplete World List of Scientific Periodicals.

The Royal Society of Medicine in Wartime

Notwithstanding the war, the work of the Royal Society of Medicine goes on unimpaired, though paper control has, as in the case of all periodicals, reduced the size of the printed proceedings and prevented the publication in them of important papers. Some, however, have appeared in the medical journals. In normal times these papers would have appeared both in the proceedings and in the journals. The membership of the society has reached the highest level ever attained, just over six thousand, and shows an increase of 50 per cent in the last fifteen years. The meetings of the society in the past year have been larger in number and better attended than ever. This is accounted for by the special interest in the topics of war medicine discussed and the large number of guests from the dominion and allied forces, to whom hospitality has been extended. By their contributions the discussions have been greatly enriched, especially by medical officers of the American and Canadian forces. Two distinguished physicians from the United States—Dr. Thomas Parran and Dr. Hugh Young—and Prof. T. A. Jurasz of Poland have been elected honorary fellows. Interallied conferences on military medicine have been arranged for the benefit of the fighting forces. For obvious reasons the discussions will take place in private. Committees of the society are dealing with the subject of interned medical aliens, education in otorhinolaryngology and, in collaboration with the Royal Medico-Psychological Society, with the future of psychiatry in all its branches.

Marriages

WILLIAM HAMILTON WALKER, Memphis, Tenn., to Miss Anne Marie Byrne of Salem, Mass., at Quonset Point, R. I., in August.

WILLIAM HARRISON WILLIAMS JR., Charlotte, N. C., to Miss Helen Adeline Wheeler of Boston in Portland, Maine, July 3.

THOMAS ANDREW MURRAH, III, to Miss Louise Young Workman, both of Charlotte, N. C., August 14.

CHARLES WAIT LLOYD, Rochester, N. Y., to Miss Eva Katherine Machen of Belmont, Mass., August 14.

WALLACE W. LINDAHL, Gainesville, Texas, to Miss Roberta Alice Collins of Coleridge, Neb., July 7.

CHARLES M. DRUECK JR., Chicago, to Miss Alice Lucille Finch of Iroquois, Ill., September 11.

PHILIP MERTZ, Dupont, Pa., to Miss Rosalie Levkoff of Columbia, S. C., September 19.

ROBERT W. KING to Miss Dorothy Williamson Sisk, both of Fayetteville, N. C., July 13.

JOHN C. PIERSON to Mrs. Stella Todd Demorest, both of New York, September 23.

MATHEW GINSBURG, Toledo, Ohio, to Miss Hazel W. Culp of Los Angeles, July 31.

Deaths

Ira Solomon Wile ✠ New York; University of Pennsylvania Department of Medicine, Philadelphia, 1902; formerly lecturer in educational hygiene, New York University and in dietetics and nutrition in the department of dental hygiene at Columbia University, the New School for Social Research, New York University, Hunter College, Columbia University College of Physicians and Surgeons, College of the City of New York and Brooklyn College and for the American Social Hygiene Association; commissioner of education of the city of New York from 1912 to 1918; member of the New York Milk Commission; a founder of the New York school lunch system, Manhattanville Nursery, the National Round Table for Speech Improvement and the Association for Personality Training, of which he was president from 1929 to 1941; a director of the American Birth Control League; member of the advisory council of the Birth Control Clinical Research Bureau and the National Committee on Federal Legislation for Birth Control; member of the American Psychiatric Association, the National Committee for Mental Hygiene, International Committee for Mental Hygiene, American Public Health Association, American Speech Correction Association, Society for the Advancement of Education, American Child Health Association and the American Academy of Political and Social Science; member and in 1932 president of the American Orthopsychiatric Association; specialist certified by the American Board of Psychiatry and Neurology, Inc.; associate in pediatrics and formerly assistant clinical pathologist in the dispensary at the Mount Sinai Hospital and clinical pathologist in the children's department of the Vanderbilt Clinic; hospital steward in the Army during the Spanish-American War; author and editor; aged 65; died, October 9, of coronary thrombosis.

Sidney A. Chalfant ✠ Pittsburgh; University of Pennsylvania Department of Medicine, Philadelphia, 1901; professor of clinical gynecology at the University of Pittsburgh School of Medicine; specialist certified by the American Board of Obstetrics and Gynecology, Inc.; past president and secretary and for many years a member of the board of directors of the Allegheny County Medical Society; member of the American Gynecological Society; fellow and past president of the Pittsburgh Academy of Medicine; fellow of the American College of Surgeons; chief of the gynecologic department of Allegheny General Hospital; instrumental in founding and organizing the Woman's Hospital, where he was president of the board of directors and chairman of the hospital staff; a staff member of the Magee Hospital; formerly on the staffs of Columbia and St. Margaret Memorial hospitals; awarded the honorary degree of doctor of science from Geneva College, Beaver College, Pa.; aged 68; died, August 31, of pneumonia.

George Herbert Taylor ✠ Maplewood, N. J.; New York Homeopathic Medical College and Hospital, 1904; member of the American Academy of Orthopaedic Surgeons; fellow of the American College of Surgeons; attending orthopedic surgeon and chief of fracture service, Orange Memorial Hospital; attending orthopedic surgeon, East Orange General Hospital, Morristown Memorial Hospital and the Essex County Hospital for Contagious Diseases, Belleville; consulting orthopedic surgeon, Children's Country Home, Westfield, Betty Bacharach Home for Afflicted Children, Longport, Montclair Community Hospital, and the New Jersey Orthopaedic Hospital, Orange; aged 61; died, August 25, of heart disease.

David Yandell Keith ✠ Louisville, Ky.; University of Louisville Medical Department, 1909; member of the American Roentgen Ray Society, American College of Radiology and the American Radium Society; specialist certified by the American Board of Radiology, Inc.; on the staffs of the Louisville General, Methodist Deaconess, Kentucky Baptist and the Children's Free hospitals; instructor in surgery at his alma mater from 1909 to 1911, instructor in proctology from 1911 to 1915, instructor in roentgenology from 1916 to 1923, clinical instructor in radiology from 1923 to 1938 and since 1938 clinical associate in radiology; aged 61; died, July 12, of heart disease.

George Ernest Johnson ✠ Philadelphia; Medico-Chirurgical College of Philadelphia, 1904; assistant professor of laryngology at the Medico-Chirurgical College, Graduate School of Medicine, University of Pennsylvania; specialist certified by the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; chief of the division of communicable diseases for the city department of health from 1934 to 1942; on the visiting staff of the Philadelphia Hospital for Contagious Diseases; served on the staff of St. Agnes Hospital; aged 61; died, August 12, of coronary occlusion.

Henry Nathaniel Sisco ✠ Baltimore; George Washington University School of Medicine, Washington, D. C., 1909; member of the Washington State Medical Association; served during World War I; formerly associated with the Indian Service; had been health officer of an Indian reservation in Nespelem, Wash.; served as medical superintendent of the Chilocco Indian School Hospital, Chilocco, Okla., the Clinton (Okla.) Indian Hospital, Salem Indian School Hospital, Chemawa, Ore., and the Washington (D. C.) Sanitarium, Takoma Park, Md.; aged 72; died in the United States Marine Hospital, August 4, of retroperitoneal neuroblastoma.

Lewis Weimer Elias ✠ Asheville, N. C.; Columbia University College of Physicians and Surgeons, New York, 1903; member and past president of the state board of medical examiners; past president of the Buncombe County Medical Society; served as secretary-treasurer of the North Carolina Pediatric Society; member of the Southern Medical Association; specialist certified by the American Board of Pediatrics, Inc.; pediatrician to the Asheville Mission, Aston Park and Norburn hospitals, Asheville, and the Biltmore (N. C.) Hospital; aged 66; died, August 10, of coronary thrombosis.

John Joseph Finerty, Derby, N. Y.; Niagara University Medical Department, Buffalo, 1888; at one time vice president of the Medical Society of the State of Pennsylvania; formerly brigadier general for the Pennsylvania National Guard; served on the staffs of the Charity Eye, Ear and Throat Hospital and the Sisters Hospital; aged 77; died in Buffalo, September 18, of arteriosclerosis.

Adrian William Frankow, West Bend, Wis.; Marquette University School of Medicine, Milwaukee, 1934; member of the State Medical Society of Wisconsin; served on the staff of St. Joseph's Hospital; appointed a first lieutenant in the medical corps, Army of the United States, in May 1942 and began extended active duty in June 1942 at Fort George Wright, Wash.; a flight surgeon; placed on the inactive list, June 16, 1943; aged 33; died in the Mayo Clinic, Rochester, Minn., August 10, of pulmonary edema.

Oliver Hubbard Gibbs, Waldron, Mich.; Eclectic Medical Institute, Cincinnati, 1891; aged 84; died, August 15, of coronary occlusion and general arteriosclerosis.

Louis W. Grosse ✠ St. Louis; St. Louis University School of Medicine, 1906; served on the staffs of the Lutheran Hospital and Evangelical Deaconess Home and Hospital; aged 58; died, August 20, of heart disease.

George Jacob Gordon, Minneapolis; Jefferson Medical College of Philadelphia, 1900; formerly adjunct professor of therapeutics and instructor in clinical obstetrics at the Minneapolis College of Physicians and Surgeons, the medical department of Hamline University; a founder and for many years director of the Talmud Torah Hebrew School; aged 69; died in St. Mary's Hospital, July 26, of coronary thrombosis.

Andrew Fidelis Gugsell, Ferdinand, Ind.; Kentucky School of Medicine, Louisville, 1907; member of the Indiana State Medical Association; at one time served as postmaster at Jasper; served during World War I; aged 67; died in the Stork Hospital, Huntingburg, August 9, of cerebral hemorrhage.

Emmette Marvin Guthrie, Thompson, Ala.; Vanderbilt University School of Medicine, Nashville, Tenn., 1905; member of the Medical Association of the State of Alabama; aged 60; died, July 8, of chronic myocarditis, arteriosclerosis and chronic pulmonary tuberculosis.

William Carleton Harris, Cincinnati; Miami Medical College, Cincinnati, 1897; member of the Ohio State Medical Association and the American Academy of Ophthalmology and Otolaryngology; on the staffs of the Deaconess and Jewish hospitals; aged 72; died, August 12, of heart block.

Gustave Hartman ✠ Lynn, Mass.; Jefferson Medical College of Philadelphia, 1904; served during World War I; major in the medical reserve corps of the U. S. Army not on active duty; aged 66; on the staff of the Union Hospital, where he died, August 1, of uremia.

James Francis Hatfield, Rossville, Ind.; Medical College of Ohio, Cincinnati, 1897; aged 69; died, August 13, of sarcoma.

Manley Hewitt Haynes, Menahga, Minn.; University of Minnesota Medical School, Minneapolis, 1920; served as health officer and deputy coroner; on the staff of the Wesley Hospital, Wadena; aged 54; died, August 8, of pneumonia.

Robert **Francis Heatley** ✠ Toledo, Ohio; University of Michigan Medical School, Ann Arbor, 1923; fellow of the American College of Surgeons; served during World War I; member of the staffs of Lucas County and Women's and Children's hospitals; aged 47; secretary of the staff and director of the department of obstetrics and gynecology at the Mercy Hospital, where he died, August 3, of Banti's disease.

Edmund Bowman Ilyus, Lancaster, Pa.; Jefferson Medical College of Philadelphia, 1882; aged 83; died, August 2, of senility.

Edward Herman Katterhenry, Indianapolis; Gross Medical College, Denver, 1897; a captain in the medical department at Camp Custer, Mich., and head of the urology department at the Walter Reed General Hospital, Washington, D. C., during World War I; aged 69; died in the Veterans Administration Facility, Marion, Ind., August 8, of uremia.

E. H. Kenimer, Bishop, Ga.; Atlanta Medical College, 1897; county physician and chairman of the Selective Service Board; on the staff of St. Mary's and General hospitals, Athens; aged 70; died, July 8, of heart disease.

Cyrus Kurtz, Paterson, N. J.; University of Maryland School of Medicine, Baltimore, 1902; also a dentist; aged 73; died in the Paterson General Hospital, July 23, of cerebral hemorrhage and arteriosclerosis.

William T. Loftin, Gore, Okla.; Gate City Medical College, Texarkana, Ark., 1905; aged 78; died in Tulsa, July 23, of myocarditis.

Charles Holder McArthur, Rome, Ga.; Chicago College of Medicine and Surgery, 1917; member of the Medical Association of Georgia; on the staff of the McCall Hospital; aged 47; died, August 2, of uremia and lung infection.

James Foulhouge McCaleb, Carlisle, Miss.; Medical Department of Tulane University of Louisiana, New Orleans, 1891; aged 76; died, July 25, of carcinoma of the intestine.

William Nelson MacChesney, Evanston, Ill.; Northwestern University Medical School, Chicago, 1902; at one time on the staffs of the Wesley Memorial Hospital, Chicago, and St. James Hospital, Chicago Heights; aged 67; died in the Illinois Masonic Home, Sullivan, August 18, of Parkinson's disease.

Thomas E. McGarity, Como, Texas (licensed in Texas under the Act of 1907); member of the State Medical Association of Texas; served several terms as mayor of Como and as a member of the board of education of the public schools; aged 70; died, July 9, of heart disease.

Charles White MacGuire, Toledo, Ohio; Toledo Medical College, 1898; also a pharmacist; aged 69; died in Columbus, July 29, of heart disease.

Samuel O. Marrs, Chickasha, Okla.; University of Tennessee Medical Department, Nashville, 1893; past president of the Grady County Medical Society; formerly city and county superintendent of public health; at one time secretary of the U. S. Board of Pension Examiners; examiner for the local draft board during World War I; served on the staff of the General Hospital; aged 76; died, August 6, of carcinoma of the liver.

Homer Preston Marsh, Syracuse, N. Y.; University of the City of New York Medical Department, 1891; formerly coroner of Fulton, Oswego County, N. Y.; served on the staff of the Crouse-Irving Hospital; aged 76; died in St. Joseph Hospital, July 29, of coronary thrombosis.

George Walworth Mellon, New York; University of Pennsylvania School of Medicine, Philadelphia, 1913; had been decorated by Crown Prince Alexander of Serbia for his typhus preventive work among the Serbians; served in France during World War I; formerly consultant to the city board of health and on the staffs of the New York Skin and Cancer Hospital and the New York Post-Graduate Medical School and Hospital; aged 53; died, August 7, of heart disease.

Frank Waldo Merritt ✠ Gary, Ind.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1905; fellow of the American College of Surgeons; for many years chief medical officer of the Carnegie-Illinois Steel Corporation; served during World War I; on the staffs of St. Mary's Mercy and Methodist hospitals; aged 61; died in his summer home in Miller, August 18, of heart disease.

Walter Stevenson Moyer, Sayre, Pa.; Temple University School of Medicine, Philadelphia, 1910; member of the Medical Society of the State of Pennsylvania; aged 70; died, July 18, of peritonitis with multiple abscesses due to diverticulitis of the colon.

Parley Pratt Musser, Oakland, Calif.; College of Physicians and Surgeons, Baltimore, 1907; at one time bacteriologist for the city of Oakland; aged 69; died, July 20, of cerebral thrombosis.

John P. Sellman, Washington, Ind.; College of Physicians and Surgeons, Baltimore, 1896; served as medical examiner for the Baltimore and Ohio Railroad; aged 69; died, August 19, of uremia, pyelitis and cystitis.

Charles S. Shoaff, Volant, Pa.; Keokuk (Iowa) Medical College, 1895; aged 77; died in the Jameson Memorial Hospital, New Castle, July 13, of nephritis due to benign hypertrophy of the prostate.

Frank Voshell Slaughter, Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1899; aged 78; died in the Women's Homeopathic Hospital, August 27, of heart disease.

James Augustus Smith ✠ Philadelphia; University of Pennsylvania School of Medicine, Philadelphia, 1911; served during World War I; on the courtesy staffs of the Kensington Hospital for Women and the Hahnemann Hospital; aged 55; died in the Presbyterian Hospital, August 11, of coronary occlusion.

Carl Kennedy Struble, Loveland, Colo.; Kansas City University of Physicians and Surgeons, Kansas City, Mo., 1919; aged 69; died in Fremont, Neb., July 30.

Merle O. Thoreson, South St. Paul, Minn.; University of Minnesota Medical School, Minneapolis, 1930; member of the Minnesota State Medical Association; member of the medical staff of Swift and Company; on the staffs of St. Luke's, St. Joseph's and Children's hospitals, St. Paul; aged 38; died, July 17, of coronary occlusion and myocardial fibrosis.

DIED WHILE IN MILITARY SERVICE

John Pierce Beeson ✠ Lieutenant Colonel, M. C., U. S. Army, Kansas City, Mo.; Washington University School of Medicine, St. Louis, 1905; School for Flight Surgeons and the Air Service Pilot School, 1921; commissioned a captain in the medical corps of the U. S. Army in 1920, a major in 1929 and a lieutenant colonel in 1937; during World War I served in France as chief of the surgical staff of an evacuation hospital near Verdun; had been in command of the station hospital at Fort Hancock, N. J., and a hospital at Salina, Kan.; fellow of the American College of Surgeons; aged 59; died in Brownsville, Texas, August 1, of coronary occlusion.

John Beegan Byrne, Nyack, N. Y.; Columbia University College of Physicians and Surgeons, New York, 1933; member of the Medical Society of the State of New York; diplomate of the National Board of Medical Examiners; at one time resident on the staff of the New York Reconstruction Home, West Haverstraw; captain in the medical corps, Army of the United States; aged 36; died in a station hospital at Newfoundland, August 10, of meningitis.

Stewart Fulton, Cleveland; Rush Medical College, Chicago, 1934; formerly resident on the staff of the Fairview Hospital; served as medical missionary for the Presbyterian Board of Foreign Missions in India; commissioned a first lieutenant in the medical corps, Army of the United States, May 23, 1942 and assigned to the Air Transport Command in New York; aged 37; died in the Asiatic area, August 25, of a skull fracture (circumstances unknown).

Lloyd P. Gieringer, Toledo, Ohio; University of Cincinnati College of Medicine, 1923; formerly a member of the Mercy Hospital; commissioned a lieutenant commander in the medical corps of the U. S. Naval Reserve, Oct. 31, 1942; stationed at the U. S. Naval Hospital, Newport, R. I., where he died, August 31, of bronchopneumonia, aged 45.

John Dendy McBrearty, Williamston, S. C.; Medical College of the State of South Carolina, Charleston, 1938; commissioned a first lieutenant in the medical reserve corps of the U. S. Army, Sept. 29, 1941, and later a captain; an aviation medical examiner attached to the antisubmarine command; aged 29; died in an airplane accident near Earlton, N. Y., July 22.

Correspondence

CENSORSHIP OF MEDICAL PERIODICALS

To the Editor:—In THE JOURNAL of May 8, which has just now come to hand, I have read with interest and sympathy the communication of Dr. Houssay protesting against the censorship of medical articles. We in India also have been sufferers in this respect. Although, as far as I know, no issue of THE JOURNAL coming to India has until now been censored, since the nonarrival of certain numbers has been ascribed naturally to enemy action, nevertheless one number of the *American Journal of the Medical Sciences* did arrive badly blotted and cut up. Also the April 1943 number of the *Surgical Clinics of North America* has failed entirely to arrive and its publishers have written to say that the fault is censorship in this case. From advertisements appearing elsewhere, I understand that the April issue of the *Surgical Clinics of North America* had a symposium on war surgery. It can only be concluded that American censorship is keeping information from this country which might be of value in India's war effort. It is difficult to understand an attitude that will interfere with the dissemination of medical knowledge under any circumstances. Still less understandable is the keeping of such information from nations which are America's allies in the present struggle.

L. B. CARRUTHERS, M.D.
Miraj Christian Medical School,
Miraj, S. M. C.

"CONTACT, CONTACT-INFECTIVE AND INFECTIVE-ALLERGIC DERMATITIS"

To the Editor:—I should like to make a few comments on the article by Drs. Stokes, Lee and Johnson entitled "Contact, Contact-Infective and Infective-Allergic Dermatitis" appearing in THE JOURNAL, September 25.

A bilateral chronic and recurrent dermatitis of the hands of a physician should be considered to be due to a rubber glove sensitivity until proved otherwise. Dr. Stokes neglected to point out an occasionally important factor—that of localized sensitivity. Localized or regional epidermal sensitivity has long been recognized by dermatologists. An example of this is nail polish dermatitis of the eyelids and face, where patch tests of nail polish may be negative on the arms or back yet be strongly positive when applied to the forehead or side of the neck. In the same manner patch tests of a suspected rubber glove actually causing a dermatitis of the hands may yield a negative test when performed on the back or arm. For this reason rubber glove dermatitis of the hands has been missed in some physicians and the dermatitis considered to be soap and water dermatitis or an eczematoid dermatophytid. The latter may be the case especially when a coexisting dermatitis of the feet due to rubber or rubber cement of the shoes is considered to be due to dermatophytosis.

I wish to recommend strongly that every physician with a suspected rubber glove dermatitis be tested on the hands. This may be done by patch tests, but I have found the simplest method to be that of wearing a cotton glove with a small hole cut out of the back under the rubber glove. If the patient is sensitive, a small patch of dermatitis corresponding to the hole in the back of the cotton glove will appear.

The wearing of Neoprene or rubber gloves to which the patient is not sensitive may not end his troubles, for he may come into contact with innumerable other rubber articles. I have one patient, a woman, who, while working in the processing department of a synthetic rubber plant, became sensitive to the synthetic rubber with a resulting dermatitis of the hands and forearms. After recovery she obtained work as a secretary. A short time thereafter a troublesome dermatitis appeared on her hands. Patch tests of a rubber typewriter eraser, rubber typewriter key pads, a rubber covered adjustment knob on the typewriter, a rubber finger protector and the rubber telephone receiver all gave strongly positive reactions.

C. RUSSELL ANDERSON, M.D., Los Angeles.

DOCTORS AS "SOFT TOUCH" FOR NARCOTIC ADDICTS

To the Editor:—Because of the shortage of narcotic drugs in the illicit traffic, drug addicts are calling on members of the medical profession looking for a "soft touch." This is the addict's term for a doctor who will write a narcotic prescription after listening to a plausible tale. Hundreds of such cases are coming to our attention.

A drug addict goes into a doctor's office and simulates a bad cough. He tells the doctor that the only thing that will help him is a drug, the name of which he has on a slip of paper. He shows the doctor this slip of paper, on which the word Dilaudid is written. He takes a chance that the doctor is unaware of the fact that this drug is a derivative of morphine. It is surprising how many doctors follow the addict's suggestion and write a prescription for Dilaudid.

In another racket the physician is imposed on in a rather unusual manner and generally writes morphine prescriptions for quantities ranging from thirty to eighty ¼ grain tablets. The addict calls on a physician and says his wife is in the care of a nurse and enroute by train to join him; that his wife is in a very serious physical condition, necessitating the use of morphine. He says that the doctor has been highly recommended and that he wants him to take care of his wife on her arrival, place her in a hospital and perform an operation if necessary. The addict offers a retainer. He then alleges that his wife has just stopped off in a nearby city and is unable to proceed by train until a supply of morphine is obtained; that the nurse telephoned him that his wife's supply is exhausted. The physician writes a prescription for morphine, which the addict claims he will send to his wife by air mail. In some cases the doctor has been taken in by this story to the extent that he has retained a room in a hospital for a week until he realizes that he has been victimized.

When addicts find a notice of a doctor's death in an obituary column they sometimes call on the bereaved widow on the day following the death alleging that they are narcotic inspectors and have come to take charge of the doctor's morphine stock.

Pharmacists are being deluged with forged narcotic prescriptions. Blank pads are stolen from doctors' desks by addicts. Several times we have referred to numerous thefts of physicians' bags containing narcotics. A doctor's bag left in a parked automobile near a hospital is invariably stolen by a drug addict.

Physicians are being imposed on with increased frequency. I know they are extremely busy during this emergency. They should be warned to be on guard when a stranger tries to induce them to write a narcotic prescription. Many of the drug addicts today tell us that they are obtaining narcotics to satisfy their craving by going to various physicians and simulating some serious physical ailment.

H. J. ANSLINGER, Washington, D. C.
Commissioner of Narcotics.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in THE JOURNAL, Oct. 23, page 504.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 20-22. Sec., Dr. B. F. Austin, 519 Dexter Ave., Montgomery.

ARKANSAS: * *Medical.* Nov. 3-4. Sec., Dr. D. L. Owens, Harrison. *Eclectic.* Little Rock, Nov. 4. Sec., C. H. Young, 1415 Main St., Little Rock.

CONNECTICUT: * *Written.* Hartford, Nov. 9-10. *Endorsement.* New Haven, Nov. 23. Sec. to the Board, Dr. Creighton Barker, 258 Church St., New Haven. *Homeopathic.* Derby, Nov. 9. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: *Written.* Dover, Jan. 11-13. *Endorsement.* Dover, Jan. 18. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

DISTRICT OF COLUMBIA: * Washington, Nov. 8-9. Sec., Commission on Licensure, Dr. G. C. Ruhland, 6150 E. Municipal Bldg., Washington.

FLORIDA: * Jacksonville, Nov. 22-23. Sec., Dr. William M. Rowlett, Box 786, Tampa.

GEORGIA: October or November. Sec., State Examining Boards, Mr. R. C. Coleman, 111 State Capitol, Atlanta.

IDAHO: Boise, Jan. 11. Dir., Bureau of Occupational Licenses, Mrs. Lela D. Painter, 355 State Capitol Bldg., Boise.

IOWA: * Iowa City, Dec. 27-29. Dir., Division of Licensure and Registration, Mr. H. W. Grefe, Capitol Bldg., Des Moines.

KANSAS: Kansas City, Feb. 2-3. Sec., Dr. J. F. Hassig, 905 N. Seventh St., Kansas City.

KENTUCKY: Louisville, Dec. 6-8. Sec., Dr. Philip E. Blackerby, 620 S. Third St., Louisville.

LOUISIANA: New Orleans, Dec. 21-23. Sec., Dr. R. B. Harrison, 1507 Hibernia Bank Bldg., New Orleans.

MAINE: Portland, Nov. 9-10. Sec., Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Medical.* Baltimore, Dec. 14-17. Sec., Dr. J. T. O'Mara, 1215 Cathedral St., Baltimore. *Homeopathic.* Baltimore, Dec. 14-15. Sec., Dr. J. A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, Nov. 16-19. Sec., Board of Registration in Medicine, Dr. H. Q. Gallupe, 413-F State House, Boston.

MISSOURI: St. Louis, Nov. 15-17. Sec., State Board of Health, Dr. James Stewart, State Capitol Bldg., Jefferson City.

NEVADA: *Endorsement.* Carson City, Nov. 1. Sec., Dr. G. H. Ross, 215 Carson St., Carson City.

NEW HAMPSHIRE: Concord, March 9-10. Sec., Board of Registration in Medicine, Dr. D. G. Smith, State House, Concord.

NORTH CAROLINA: December. Sec., Dr. W. D. James, Hamlet.

NORTH DAKOTA: Grand Forks, Jan. 4-7. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OHIO: *Written.* Columbus, Dec. 13-15. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus.

OKLAHOMA: * Oklahoma City, Dec. 27-29. Sec., Dr. J. D. Osborn Jr., Frederick.

PENNSYLVANIA: Philadelphia and Pittsburgh, January. Act. Sec., Bureau of Professional Licensing, Department of Public Instruction, Mrs. Marguerite G. Steiner, 358 Education Bldg., Harrisburg.

SOUTH CAROLINA: Charleston, Dec. 20-22. Sec., Dr. N. B. Heyward, 1329 Blanding St., Columbia.

SOUTH DAKOTA: * Pierre, Jan. 18-19. Dir., Medical Licensure, State Board of Health, Dr. Gilbert Cottam, Pierre.

VERMONT: Burlington, Dec. 16-18. Sec., Dr. F. J. Lawliss, Richford.

VIRGINIA: Richmond, Dec. 14-17. Sec., Dr. J. W. Preston, 30½ Franklin Road, Roanoke.

WISCONSIN: * Madison, Dec. 13-15. Sec., Dr. C. A. Dawson, Tremont Bldg., River Falls.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

FLORIDA: DeLand, Nov. 6. Sec., Dr. John F. Conn, John B. Stetson University, DeLand.

NEW MEXICO: Feb. 7. Sec., Miss Pia Joerger, State Capitol, Santa Fe.

OKLAHOMA: Oklahoma City, Nov. 29. Sec., Dr. J. D. Osborn Jr., Frederick.

RHODE ISLAND: Providence, Nov. 17. Chief, Division of Examiners, Mr. Thomas B. Casey, 366 State Office Building, Providence.

SOUTH DAKOTA: Vermillion, December. Sec., Dr. G. M. Evans, Yankton.

TENNESSEE: Nashville and Memphis, Dec. 10-11. Sec., Dr. O. W. Hyman, 874 Union Ave., Memphis.

WISCONSIN: Milwaukee, Dec. 4. Sec., Prof. Robert N. Bauer, 152 W. Wisconsin Ave., Milwaukee.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Legality of the Corporate Practice of Medicine.—The Bartron Clinic was organized in 1929 as a corporation for profit and, in general, it operated in South Dakota a hospital and clinic and supplied medical and surgical services and necessary drugs to persons availing themselves of its services. In carrying on its activities it acted, to all practical purposes, only through licensed physicians and surgeons and nurses in its employ. Each employee seemed to have confined his or her activities to fields in which he or she was licensed to practice. The corporation had 750 shares of capital stock, all but 28 of which were owned by duly licensed physicians connected with the activities of the corporation. Admittedly the corporation was not licensed to practice medicine and surgery nor to operate a pharmacy in South Dakota. In 1933 and in succeeding years until 1938, when it ceased to do business, the corporation contracted on an annual basis with Codington County, S. D., to furnish necessary hospitalization, medical and hospital services and medicine to the poor of the county for whom it was the duty of the county to provide. Subsequent to the time when the corporation ceased to do business three cases involving the contracts between the corporation and the county were instituted. In one case a claim was filed with the county commissioners for compensation for medicines supplied to county indigents. Another case originated as a claim for the recovery of compensation for medical and surgical services rendered by the corporation. The third case originated as an action by the county to recover monies paid from 1933 on to the corporation for medical and surgical services and medicines furnished to the county indigents by the corporation. The judgments in the lower court in these cases were adverse to the corporation. On appeal, the Supreme Court of South Dakota disposed in a single opinion of the issues presented in the 3 cases.

To sustain the judgments of the trial court the county contended, first, that under the medical practice act of South Dakota the corporate practice of medicine was illegal and a corporation could neither recover nor retain compensation for acts in violation of that act. In the exercise of the police powers of the state, said the Supreme Court, the legislature can prohibit corporations from engaging in the business of supplying for gain the services of licensed physicians. The question here is whether or not the South Dakota medical practice act evidences an intent on the part of the legislature to do so. Section 7717, Compiled Laws, 1919 (a section of the medical practice act), provides a penalty for "*any person* who shall *practice* medicine . . . in this state without having obtained a license." Assigning to the word "practice" the broad signification of common usage, and applying also the statutory rule that "person" also includes a corporation, the corporation, functioning through licensed physician employees acting within the scope of their authorized powers, has practiced medicine and surgery in apparent violation of the act unless a different legislative intent is plainly revealed elsewhere in the act. The most cursory analysis of the medical practice act reveals that it was motivated by a purpose to bring a high standard of character and competence to the diagnosis and treatment of human ailments and to prevent the quack and the unfit from ministering unto the ills of mankind. To accomplish these purposes a system of licensure was set up, based on personal qualifications including age, character, schooling, training and professional conduct, and a penal provision was added to the act to deter the unfit from treating patients. It will be further noted that throughout the act the legislature has dealt with the functions of natural persons and has ignored their legal relationships. Although the act, by the power it grants, in sections

7710 and 7711, *ibid.*, to revoke a license to practice, seeks to regulate the practice of licentiates by stating as a cause for revocation "unprofessional conduct" and enumerating certain types of conduct that are embraced in the term, it is significant that there is not there included within such an enumeration of prohibited conduct practice for gain as the employee of an unlicensed individual or corporation. The conclusion seemed irresistible to the court that by the medical practice act the legislature intended to prevent unlicensed persons from the actual diagnosis and treatment of human ills but did not intend to prevent unlicensed persons from engaging in the business of supplying the services of licensed practitioners. The prevention of corporate practice, the court accordingly held, was not in the contemplation of the legislature when it enacted the medical practice act, and the corporation here involved, in contracting with the county, did not bargain to do that which is prohibited by the medical practice act.

To sustain the judgments adverse to the corporation, the county next contended that the practice of medicine by a corporation through the agency of employees who are licensed to practice medicine is illegal because it is against public policy or public interest and a corporation so practicing is not entitled to recover or retain compensation for its illegal acts. Public policy, said the court, is that principle of law which holds that no person can lawfully do that which has a tendency to be injurious to the public or to be against the public good. 17 C. J. S. 563. When conduct opposed to the public interest is made the subject of a bargain, the courts ordinarily refuse to accord a party thereto a remedy predicated thereon. Restatement, Law of Contracts, sec. 598. The subject of the practice of the learned professions by a corporation has been under consideration by the courts in a variety of actions and proceedings involving the practice of law, dentistry and medicine. See annotations in 73 A. L. R. 1327 and 103 A. L. R. 1240. While decision has rarely turned on the naked issue of public policy, those courts, by dictum at least, indicate a current of opinion, to which there are but few dissentients, that the corporate practice of the learned professions contravenes the public interest and is contrary to public policy. After discussing the variety of reasons assigned therefor, the court concluded that the corporate practice of any of the learned professions of law, medicine or dentistry would tend to debase those professions and that corporate practice would have a tendency to blight the character or lower the standards of professional practice and would be in contravention to the public aspirations so clearly reflected in the licensing statutes, which, with their emphasis on character and professional conduct on the part of licentiates, evidence a fixed public desire not only to foster but to develop and reinforce the basic attributes of the professional servants of the public. The court was of the opinion that the practice of the learned professions by a corporation organized for profit, even though it functioned through duly licensed physician employees, tended to debase the profession and consequently was in contravention of the public interest and was against public policy. The contracts, the court held, between the corporation and the county with respect to the rendering of medical and surgical services were illegal and the corporation can recover nothing for the services it rendered under those contracts.

The court next considered the legality of the contracts between the corporation and the county under which the corporation undertook to supply medicines and drugs to the county poor. The corporation was not licensed to practice pharmacy, but the medicines involved were prescribed by physician employees of the corporation in the course of the practice of medicine. The pharmacy practice act provides that nothing therein contained shall apply to the business of any physician or prevent him from supplying to his patients such articles as may seem to him proper. Session Laws, 1933, chapter 163. The pharmacy practice act, said the court, clearly intended to exclude the practice of medicine from its regulatory effects. However, while thus removing the subject matter of these contracts from the scope of the pharmacy practice act, the act did not authorize the sale of medicines by a physician in any other manner than as an incident of the practice of his profession. Medication is but an integral part of the services a physician performs in treating human ailments, and the right to furnish medicine rests on the right to treat disease. It follows then, that, if it is against public policy for the corporation to engage in the practice of medicine, all of the incidents of that practice by the corporation, including medication, are contrary to public policy. The court accordingly held that that contract between the corporation and the county under which the corporation undertook to supply medicines to the county poor was illegal and that the corporation could recover nothing for its acts thereunder.

The court next considered the right of the county to recover sums previously paid to the corporation for medical and surgical services and medicines supplied to the county by the corporation. The county, said the court, while it seeks to recover the payments made to the corporation for those services and supplies, endeavors to retain the benefit of the valuable professional services and medicines it has received. It predicates its right to a refund of such payments on the theory that the bargains under which such payments were made were against public policy. It contends that it may appropriate these benefits and recover its payments. Obviously, the claim of the county is inequitable. Manifestly, justice will not be done if the county is permitted to recover its payments and retain the valuable benefits it received under the illegal contract. Had it not received the benefits of the services of the duly licensed employees of the corporation it would have been compelled to expend public funds for like services elsewhere. In procuring the needed services public policy was violated. The subject matter of the contract was not vicious in itself, and no moral turpitude was involved. The public interest is adequately and effectively protected by the obligations of a judicial policy under which the courts refuse to lend themselves to that which is against public interest. Considerations based on natural justice may be permitted to mold the judgment in this particular case without withdrawing any public safeguard or striking down any provision adopted to protect the county or its taxpayers. In our opinion, no circumstance warrants or supports a contention that, according to the ties of natural justice or for reasons based on public policy, the corporation should be obligated under the circumstances to refund to the county the monies paid to the corporation for valuable services and supplies rendered to the county. The court accordingly reversed the judgment of the trial court and held, in effect, that the corporation might retain the monies paid to it by the county.—*Bartron v. Codington County (two cases) and Codington County v. Bartron (Bartron, Intervener), 2 N. W. (2d) 337, (S. D., 1942).*

Society Proceedings

COMING MEETINGS

American Society of Anesthetists, New York, Dec. 9. Dr. McKinnie L. Phelps, 745 Fifth Ave., New York 22, Acting Secretary.

Central Society for Clinical Research, Chicago, Nov. 5. Dr. Carl V. Moore, 602 South Euclid Ave., St. Louis, Secretary.

Pacific Coast Society of Obstetrics and Gynecology, San Francisco, Nov. 4-5. Dr. T. Floyd Bell, 431 Thirtieth St., Oakland, Calif., Secretary.

Radiological Society of North America, Chicago, Nov. 29-Dec. 3. Dr. Donald S. Childs, 607 Medical Arts Bldg., Syracuse, N. Y., Secretary.

Seaboard Medical Association, Richmond, Va., Nov. 30-Dec. 2. Dr. Clarence P. Jones, 3117 West Avenue, Newport News, Va., Secretary.

Southern Surgical Association, New Orleans, Dec. 7-9. Dr. Alton Ochsner, 1430 Tulane Ave., New Orleans, Secretary.

Southern Medical Association, Cincinnati, November 16-18. Mr. C. P. Loranz, Empire Building, Birmingham, Alabama, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1933 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Clinical Pathology, Baltimore

13:383-440 (Aug.) 1943

Cephalin Cholesterol Flocculation Test in Liver Disease. K. Y. Yardumian and B. J. Weisband.—p. 383.
*Transfusion Therapy of Acute Hemolytic Anemia of Newborn. A. S. Wiener and I. B. Wexler.—p. 393.
Cerebral Injuries by Mechanical Violence. S. A. Levinson.—p. 402.
Thallium Poisoning: III. Clinical Toxicology of Thallium. A. O. Gettler and L. Weiss.—p. 422.

Transfusion in Acute Hemolytic Anemia of the Newborn.—Wiener and Wexler state that in the typical case of acute hemolytic anemia of the newborn the mother is Rh negative, the father is Rh positive and the fetus is Rh positive, the latter having inherited the factor from the father. Owing perhaps to some defect in the placenta, some of the fetal blood escapes into the maternal circulation, and in sensitive mothers this stimulates the production of anti Rh isoantibodies. Since the normal placenta is permeable to antibodies, the anti Rh isoantibodies then filter back through the placenta into the fetal circulation and give rise to the disease. In the past, infants with acute hemolytic anemia were treated by repeated transfusions with varying results. The theory of Levine et al. makes possible a more rational transfusion therapy. Whole maternal blood should not be used because in this way additional isoantibodies may be transferred to the infant and thus prolong the disease. For the same reason the baby should not be permitted to nurse, as antibodies may be transferred through the colostrum and milk. Also the father or any Rh positive donor should not be used, since the erythrocytes of such donors are susceptible to the action of the anti Rh antibodies. The most suitable donor is a normal Rh negative individual, because his cells are not sensitive to the action of the antibodies and his serum contains no anti Rh isoantibodies. The authors describe 8 cases of acute hemolytic anemia of the newborn recently treated by them. The disease is a treacherous one in that the baby may appear normal at birth and yet develop an abrupt hemolytic crisis which may cause death from anoxemia in a short time. As soon as the diagnosis is made or even suspected, arrangements should be made for immediate transfusion with Rh negative blood. Only intravenous transfusions are effective. Though transfusions in infants are technically difficult, in trained hands the procedure is carried out with ease with the aid of a small, short bevel 22 gage needle, using a scalp vein. In infants whose scalp veins are poorly developed or concealed by edema a suitable vein can as a rule be found by making an incision anterior and superior to the medial malleolus or by incising the antecubital fossa. The authors mention atypical cases due to sensitization to factors other than Rh or due to multiple sensitization. They suggest transfusion with washed mother's erythrocytes suspended in compatible plasma.

American Journal of Hygiene, Baltimore

38:1-112 (July) 1943

Statistical Significance of Negative Stool Examination in Diagnosis of Amebiasis. W. G. Sawitz and R. J. Hammerstrom.—p. 1.
Past Hospital Experience of Surviving Population, Eastern Health District, Baltimore, 1926-1935. Clara E. Councell.—p. 8.
Epidemiology of Scarlet Fever. F. F. Schwentker, J. H. Janney and J. E. Gordon.—p. 27.
Role of Intestinal Phase of Trichina Infection in Establishment of Immunity to Retention. H. Roth.—p. 99.

American Journal of Medical Sciences, Philadelphia

206:141-280 (Aug.) 1943

*Studies on Transmissibility of Malaria by Plasma Transfusions. E. L. Lozner and L. R. Newhouser.—p. 141.
Action of Specific Stimulators on Hemopoietic System. F. R. Miller and D. L. Turner.—p. 146.
Sickling Trait in White Adult Associated with Hemolytic Anemia, Endocarditis and Malignancy. L. Greenwald, J. B. Spielholz and J. Litwins.—p. 158.
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Transmissibility of Malaria by Plasma Transfusions.—Lozner and Newhouser report the results of thirty-five administrations of plasma prepared from donors with active malaria and preserved by different technics for varying lengths of time. The donors were patients with active therapeutic quartan and estivoautumnal malaria. The 35 recipients were patients with dementia paralytica or other central nervous system disease in which malaria was either indicated or not contraindicated. No transmission of malaria was observed in twenty administrations of thawed plasma which had been "shell" frozen in a solidified carbon dioxide-alcohol bath. In three administrations of restored plasma which had been dried from the frozen state no transmission took place. In two administrations of plasma preserved in the liquid state for one day there was one definite transmission and one probable transmission. In five administrations of plasma preserved in the liquid state for one week there was one doubtful transmission. In five administrations of plasma preserved in the liquid state for two weeks no transmissions were recorded. The likelihood of transmission of malaria by any plasma program regardless of type of preservation used is practically nonexistent.

Patent Ductus Arteriosus.—Shapiro and Keys investigated the longevity and cause of death in untreated and surgically treated patients with patent ductus arteriosus. Diagnosis of patent ductus arteriosus can be made with much certainty. The great majority of patients with this defect suffer no serious disability or restriction of activity during most of their lives, but their life expectancy is greatly shortened by the defect. Ligation of the uninfected ductus can be made with a mortality of less than 10 per cent. Ligation of the ductus in the presence of subacute bacterial endarteritis offers an even chance of survival in the face of practically certain death without ligation. The danger of development of subacute bacterial endarteritis after successful ligation cannot be properly estimated. Six case histories are cited which illustrate arguments for and against ligation. An analysis is presented of the results of one hundred and forty operations for ligation of the duct. The majority of patients with patency of the ductus arteriosus should be submitted to ligation after careful clinical studies have been made on them. Ligation should be attempted immediately if subacute bacterial endarteritis develops. Ten patients with uninfected patent ductus arteriosus have been operated on

by Wangensteen at the University of Minnesota Hospital, the last 8 cases with complete success. None have manifested a recurrence of signs indicating recanalization.

Clinical Significance of Hyperventilation.—According to Stead and Warren, respiration is controlled by both reflex and chemical mechanisms. Afferent stimuli from any organ in the body or from an emotional content of thought may cause the pulmonary ventilation to be increased beyond the level required by the body metabolism. This reflex increase in respiration furnishes the physiologic basis for many of the symptoms of the psychoneurotic patient. The patient may be conscious of the hyperventilation and complain primarily of dyspnea or he may complain of any of the resultant symptoms, not being aware of the increased pulmonary ventilation. The authors give several illustrative case reports. Voluntary hyperventilation in normal subjects produces a disturbance in cerebral metabolism. Usually faintness or giddiness is followed by numbness and tingling about the mouth and extremities; the hands become cold, and if the patient is standing he may faint. Prolonged hyperventilation may produce symptoms of tetany. Any of the cerebral symptoms produced by voluntary hyperventilation may appear in the anxious patient who unknowingly hyperventilates. Production of these symptoms by voluntary overbreathing not only is of diagnostic aid but is useful in demonstrating to the patient that his symptoms have a physiologic rather than a pathologic basis. At times the hyperventilation itself may be noted by the patient and may appear as a symptom, particularly in patients with heart disease without congestive failure or in patients who fear heart disease. Observation of the effects of voluntary hyperventilation should be a routine procedure in the examination of (1) patients complaining of fainting, giddiness or a far away feeling and (2) patients with breathlessness, particularly those with heart disease without evidence of congestive failure.

Sulfamerazine in Meningococcic Meningitis.—Sulfamerazine is one of several methyl homologues of sulfadiazine. Gefter and his associates used sulfamerazine for meningococcic meningitis during an epidemic of that disease in Philadelphia in the past winter. They report observations on 45 cases. The initial dose was always given intravenously as sulfamerazine sodium (5 per cent solution in sterile distilled water), adults receiving 3 Gm. and children 1 to 2 Gm. This dose was immediately followed by sulfamerazine orally, adults receiving 1 Gm. every four hours and children receiving 0.25 Gm. to 1 Gm. every six hours. Delirious or comatose patients were given the drug by nasal tube until they were capable of taking medication by mouth. Sulfamerazine was continued until the patient appeared entirely well clinically. In the successfully treated group the average total dose of the drug for adults was 56.4 Gm., given over an average period of 9.5 days; the children received an average total dose of 19.3 Gm. over an average period of 8.6 days. Five of the patients were given intravenous antimeningococcus serum in addition to sulfamerazine. Determinations of the amount of free drug in the blood were made at frequent intervals. Three deaths occurred in this series, a mortality of 6.7 per cent. This is to be compared with the 57.5 per cent mortality occurring in 40 cases of this disease at the Philadelphia General Hospital during 1935, 1936 and 1937, and with the 40 per cent in 50 cases reported in 1942. The results also compare favorably with those in which sulfadiazine was employed (12.5 per cent mortality). Clinical improvement with return of mental clarity occurred in 70 per cent of the patients within forty-eight hours. The average time observed for the return to normal temperature was 5.2 days. Toxic reactions attributable to sulfamerazine, occurring in each instance after the fifth day of treatment, were noted in 11 patients.

Sulfamerazine in Pneumococcic Pneumonia.—Flippin and his collaborators compare the response to sulfamerazine of 80 pneumonia patients with that of a control series of 80 adult patients treated with sulfadiazine. Mortality in the two groups showed no significant difference (sulfamerazine 7.5 per cent, sulfadiazine 10 per cent). Sulfamerazine tended to lower the temperature somewhat more rapidly than did sulfadiazine; however, the duration of chemotherapy and the incidence of complications were essentially the same for the two groups. The incidence of toxic reactions was low and comparable for both sulfamerazine and sulfadiazine. No serious reactions were encountered with either drug. The fact that toxic reactions were less frequent among these pneumonia patients than among those receiving sulfamerazine for meningitis is explained by the fact that medication was of shorter duration. The group treated with sulfamerazine showed higher plasma concentration of free drug than did the group receiving larger or equivalent amounts of sulfadiazine.

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American Journal of Surgery, New York

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American Journal of Tropical Medicine, Baltimore

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Background to Postwar Reconstruction: Part I. Preliminary Report on Parasitic and Other Infectious Diseases of Japanese Mandated Islands and Guam. E. P. Mumford and J. L. Mohr.—p. 381.
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*Employment of Rickettsial Vaccine for Antigen in Diagnostic Complement Fixation Test. F. H. K. Reynolds and M. Pollard.—p. 433.
Report on Species of Anopheles in British Guiana. C. O. Bruce, T. D. Knigin, S. F. Yolles and A. E. Graham Jr.—p. 437.
Clinical Observations on Spotted Fever in Gulf Coast Area of Texas. B. Reading and H. Klint.—p. 445.
Preliminary Observations on Inheritance of Susceptibility to Malaria Infection as Character of Anopheles Quadrimaculatus Say. M. F. Boyd and J. C. Russell.—p. 451.
Studies on Effectiveness of Phenothiazine in Human Nematode Infections. H. Most.—p. 459.
Note on New Transparent Cage for Collecting and Feeding Mosquitoes. S. F. Yolles and T. D. Knigin.—p. 465.

Rickettsial Vaccine as Antigen in Complement Fixation Test.—According to Reynolds and Pollard, the Weil-Felix reaction lacks specificity in the diagnosis of rickettsial infections, while the complement fixation test is rather specific in differentiating them. The complement fixation test uses antigens prepared from infected chick embryos. The commercially prepared typhus vaccine is similarly manufactured from infected chick embryos. The authors found that a commercially processed typhus vaccine is satisfactory for fixing complement with epidemic typhus antiserum. Its specificity was supported by negative results with the following heterologous specific antiserums: Rocky Mountain spotted fever rickettsia, Proteus OX 19, Eberthella typhosa, Salmonella typhi murium, Salmonella paratyphi, Salmonella schottmülleri, Salmonella pullorum, Salmonella enteritidis, Salmonella paradysenteriae, Salmonella abortivo-equinus, Pasteurella tularensis, Vibrio comma, Brucella abortus, Brucella melitensis, Trypanosoma equiperdum and Trypanosoma cruzi. Of 89 positive Wassermann and Kahn serums tested, one induced a 3 plus fixation with both the commercial purified antigen and the typhus vaccine. This one case gave a history suggestive of a typhus-like disease several years prior to the test. Thirty-two persons were given three subcutaneous injections of commercially prepared typhus vaccine of 1 cc. each at weekly intervals. On the twelfth day following the last inoculation, blood serums were collected from all of them and tested with both antigens. None demonstrated evidence of complement fixing bodies for typhus. Apparently the chick embryo menstruum in which the Rickettsiae were growing failed to induce homologous complement fixing bodies in persons injected with it. The absence of complement fixing antibodies does not necessarily imply a lack of immunity; it does demonstrate that the vaccination procedure will not result in the development of a false positive reaction.

American Review of Tuberculosis, New York

48:65-130 (Aug.) 1943

Chemistry of Lipids of Tubercle Bacilli: LXV. Investigation of Tuberculous Lung Tissue. R. J. Anderson, R. E. Reeves, M. M. Creighton and W. C. Lothrop.—p. 65.
*Culturing of Tubercle Bacilli from Human Spleen, Liver and Kidney. C. E. Woodruff, Ruby G. Kelly and Mary A. Leaming.—p. 76.
Unusual Mycobacterium: Isolated from Sputum of Man Suffering from Pulmonary Disease of Long Duration. W. H. Feldman, R. Davies, H. E. Moses and W. Andberg.—p. 82.
Treatment of Tuberculous Tracheobronchitis. R. Davies.—p. 94.
*Hemorrhage in Pulmonary Tuberculosis. G. R. Minor.—p. 109.
Some Aspects of Tuberculosis in Switzerland at Present Time. F. Homburger.—p. 115.

Culturing of Tubercle Bacilli from Human Spleen, Liver and Kidney.—Woodruff and his co-workers took cultures of human necropsy material in order to determine the number of tubercle bacilli per gram of tissue in spleen, liver and kidney. In a large majority of the cases cultures of the spleen were found positive for tubercle bacilli. A smaller proportion of liver cultures and even fewer of the kidney cultures were positive. A rather close correlation was found to exist between positive culture and microscopically demonstrable tubercles in the same organ. A high bacterial count was associated with the type rather than the number of tubercles, the highest counts being found in those organs which had caseous miliary tubercles. The number of tubercle bacilli found per gram of splenic tissue was nearly always greater than the number of bacilli in liver and kidney. The only exceptions were cases with extensive tuberculous enteritis or other abdominal tuberculosis. In these cases the liver contained more tubercle bacilli than the spleen.

Hemorrhage in Pulmonary Tuberculosis.—Minor collected data for this study from the records of 1,000 sanatorium patients. He found that hemorrhages occurred in 24.3 per cent. The average size of hemorrhage was 5 ounces (150 cc.). Forty per cent of hemorrhages eventually recurred. In 60 cases the first remarkable symptom was hemoptysis. Seventy per cent of cases with a history of hemorrhage before the diagnosis were properly diagnosed by the local physician when he was consulted. However, 13 per cent were misdiagnosed. Most tuberculous patients who have a hemorrhage have a cavitation visible on x-ray examination; 83.4 per cent of this series had a positive sputum. Trauma to the chest, strenuous exercise, mechanical disturbance of the lungs and, in females, the menstrual period are definite precipitating factors. Small hemorrhages often occur from early lesions at the height of the catarrhal and toxemic symptoms, which probably signify softening. These are not usually serious and may in the long run be beneficial if they call attention to an undiagnosed tuberculosis. However, larger hemorrhages which occur in chronic ulcerative tuberculosis, while rarely immediately fatal, are accompanied by many unpleasant and dangerous possibilities. Of the twelve deaths which occurred in the Blue Ridge Sanatorium of Charlottesville, Va., after hemoptysis it was felt that five were directly or indirectly the result of the hemorrhage.

Annals of Internal Medicine, Lancaster, Pa.

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Studies of Urinary Pigments in Pellagra and Other Pathologic States: I. Clinical Observations. C. J. Watson and J. A. Layne.—p. 183.
*Dupuytren's Contracture as Sequel to Coronary Artery Disease and Myocardial Infarction. K. C. Kehl.—p. 213.
*Cardiovascular Syphilis: Approach to Early Clinical Recognition and Early Treatment. M. Dressler and M. Silverman.—p. 224.
Lipid Metabolism in Relation to Xanthoma Diabeticorum with Recommendation for New Nomenclature. J. Garb.—p. 241.
Incidence of Acute and Subacute Bacterial Endocarditis in Rheumatic Heart Disease. R. Gelfman.—p. 253.
Concerning Infectivity of Saliva in Human Rabies. S. F Sulkin and C. G. Harford.—p. 256.
Pulmonary Tuberculosis of Insane. J. R. Blalock and J. B. Funkhouser.—p. 263.
Combined Electrocardiography, Stethography and Cardioscopy in Early Diagnosis of Heart Disease. W. M. Bartlett and J. B. Carter. —p. 271.
*Syndrome of Rupture of Aortic Aneurysm into Pulmonary Artery: Review of Literature with Report of 2 Cases. R. E. Nicholson. —p. 286.
Traumatic Heart Disease: Clinical Study of 250 Cases of Nonpenetrating Chest Injuries and Their Relation to Cardiac Disability. H. Arenberg.—p. 326.

Dupuytren's Contracture as Sequel to Coronary Artery Disease.—Kehl reports 6 cases of Dupuytren's contracture as a sequel to coronary occlusion. The palmar changes in the cases presented by Kehl appear to be typical of Dupuytren's contracture in its various stages. Three cases progressed to the stage of contracture and in no case was regression noted. Pain, stiffness, swelling, livid discoloration, numbness, tingling and abnormal skin temperature of the hands may be associated with the palmar changes. The etiology and pathogenesis are not understood, but irritation of the sympathetic ganglions may assume an important etiologic role.

Early Recognition of Cardiovascular Syphilis.—Dressler and Silverman report studies in 1,270 cases of proved syphilis which were referred for cardiovascular checkup. There were 390 cases of cardiovascular syphilis, and 304 of these were diagnosed as uncomplicated syphilitic aortitis. The authors answer in the affirmative the question whether a clinical diagnosis of uncomplicated aortitis is impossible in the presence of a normal sized aorta. They establish the following criteria for clinical diagnosis in patients 40 years of age or younger: 1. The presence of a characteristic aortic second sound, which may be described as tambour, drumlike, tympanitic or hollow and is usually heard over the second or third right sternal space and sometimes over the fourth space. 2. The presence of a

systolic murmur over the aortic area (second, third or fourth right sternal space, over the sternum, the third left sternal space or in more than one of these areas). A systolic murmur has been heard in many instances over the mitral area. 3. The presence of suprasternal (episternal) pulsations. This sign indicates elongation and dilatation of the aortic arch. 4. The presence of increased retromanubrial dulness in the second intercostal space. This sign is of value only when the aortitis is far advanced and there is a widening of the aorta. 5. The presence of hypertension as a diagnostic aid. Both systolic and diastolic pressures are elevated. 6. Corroboration of the clinical findings by the use of fluoroscopy and roentgenography to demonstrate the presence or absence of a widened aorta. All patients with cardiovascular syphilis should be started with a preparatory course of bismuth compounds and iodides before arsenical therapy is attempted. This course should consist of at least ten to twelve intramuscular injections of bismuth subsalicylate in oil (0.1 to 0.2 Gm.) at weekly intervals followed by a similar course of neoarsphenamine (0.1 Gm.) or mapharsen (0.01 Gm.), the dosage being gradually increased. With the exception of cases of uncomplicated syphilitic aortitis, the dose should not exceed 0.3 Gm. of neoarsphenamine or 0.03 Gm. of mapharsen in any cardiac condition. Arsphenamine should never be used in the treatment of cardiovascular syphilis. The treatment should be continuous for at least two years. The serologic reaction should have no bearing on the length and type of treatment. If sufficiently improved, the patient is given a rest period of six months and asked to return for a cardiovascular checkup. If the patient has developed aortic insufficiency or aneurysm, treatment must be more conservative. The preliminary bismuth and iodide therapy is started, but the arsenicals must be used with caution and in many instances they should be avoided. The life expectancy of patients with uncomplicated syphilitic aortitis who receive early and adequate treatment is a normal lifetime, whereas for patients who show complicated cardiovascular syphilis it ranges from about one to ten years.

Rupture of Aortic Aneurysm into Pulmonary Artery.—Nicholson stresses that the rarity of rupture of an aortic aneurysm into the pulmonary artery is unusual in view of the close anatomic relationship between the two vessels and the great frequency of aneurysm of the thoracic aorta. Only 81 instances have been mentioned in the literature. This low incidence may be explained on the basis of pinpoint communications between the great vessels, oversight on the part of the pathologist and failure to appreciate the condition clinically. Over a thirty year period only *2* instances were observed at the Charity Hospital of Louisiana in New Orleans. One occurred in a 39 year old woman who survived five months after rupture, and the other in a 40 year old man whose duration of life following rupture was six days. Both instances were diagnosed correctly prior to death. The author reviews the incidence of clinical manifestations which might serve for recognition of the syndrome. The history reveals a sudden onset with severe stabbing pain or a sense of oppression in the precordial area with or without radiation, usually following physical exertion and succeeded by pronounced and increasing dyspnea. The subjective signs are definite and increasing shortness of breath, progessive swelling of the lower extremities and trunk, rasping cough with expectoration or hemoptysis and bluish discoloration of the face and extremities; pallor may be the alternative. The objective signs are an intense thrill in the second to third left interspace occurring during systole or continuous throughout the cardiac cycle; humming "machine-like" murmur, heard best to the left of the sternum in the second or third interspaces, continuous throughout the systolic and diastolic phase and crescendo-decrescendo in character, being more intense during systole; evidence of aneurysm of the aorta; increasing dyspnea usually reaching the extent of orthopnea; cyanosis of the lips, face or extremities or distinct pallor of the same areas; edema of the lower extremities and trunk progressing to anasarca; the hemodynamic phenomena of aortic regurgitation (Corrigan's pulse, increased cardiac rate, capillary pulsation, Duroziez's sign); roentgenographic evidence of aneurysmal dilatation of the aorta, prominent and enlarged pulmonary conus and probable enlargement of the heart; electrocardiographic indications of a nonspecific character but usually indicative of a sinus tachycardia, right axis deviation, and lowering, inversion or diphasicity of the T waves in the standard and precordial leads.

Annals of Surgery, Philadelphia

118:161-328 (Aug.) 1943

Address of President: Importance of Fundamentals in Surgical Education. V. C. David.—p. 161.
*Study of Prevention of Infection in Contaminated Accidental Wounds, Compound Fractures and Burns. F. L. Meleney.—p. 171.
Basic Principles in Treatment of Thermal Burns. A. O. Whipple.—p. 187.
Gelatin as Plasma Substitute, with Particular Reference to Experimental Hemorrhage and Burn Shock. W. M. Parkins, C. E. Koop, C. Riegel, H. M. Vars and J. S. Lockwood.—p. 193.
*Problems of Protein Nutrition in Burned Patients: F. H. L. Taylor, S. M. Levenson, C. S. Davidson, N. C. Browder and C. C. Lund.—p. 215.
*Amino Acids, Serum and Plasma in Replacement Therapy of Fatal Shock Due to Repeated Hemorrhage: Experimental Study. R. Elman and C. E. Lischer.—p. 225.
*Traumatic Shock: Experimental Study Including Evidence Against Capillary Leakage Hypothesis. J. Fine, A. M. Seligman and H. A. Frank.—p. 238.
Role of Nervous System in Shock. D. B. Phemister.—p. 256.
Surgical Gut (Catgut) Tubing Fluid as Tissue Irritant. C. L. Dunham and H. P. Jenkins.—p. 269.
Hydrocarbon Content of Nonboilable Surgical Gut Tubin Fluids. A. E. Sidwell Jr.—p. 285.
Irritant Properties of Tubing Fluids as Factor in Tissue Reactions Observed with Surgical Gut (Catgut). H. P. Jenkins and C. L. Dunham.—p. 288.
Surgical Principles Opposed to "Rule of Thumb" in Treatment of Compound Fractures. C. R. Murray.—p. 305.
Medical Treatment of Hematogenous Osteomyelitis. D. E. Robertson.—p. 318.

Prevention of Infection in Contaminated Accidental Wounds.—Meleney summarizes records from 1,500 cases which include 682 wounds of the soft parts, 471 compound fractures and 347 burns. Studies had been carried out by a number of different units to establish the effect of the sulfonamides on accidental wounds. There was no evidence that either sulfanilamide or equal parts of sulfanilamide and sulfadiazine locally or sulfadiazine generally with or without the local use of drugs have cut down the incidence of local infection in wounds of the soft parts. It is true, however, that the incidence of septicemia or of death is extremely low in this series and it may be stated that the spread of infection from the local site has been minimized. The combined local and general or general use of sulfonamides alone has not lowered the incidence of local infection in compound fractures. Although there were only *2* patients who died as a result of infection, and these yielded no positive blood cultures, a fair number of patients needed secondary surgical procedures because of wound infection. The infection rate in burns is very disturbing, particularly in the deep second and third degree cases. There is evidence that there may be greater or less absorption of the drugs from burned surfaces according to the vehicle in which the sulfonamide drugs are contained. The ideal vehicle has not been found. Many are being tried. The local drug action may be inhibited while the general effect may be obtained from local applications. There were only two burn deaths in which infection played an important part and these were so extensive that death might have occurred without infection. In both, local and general sulfonamide treatment was administered. The author concludes that the sulfonamides minimize the general spread of infections and cut down the incidence of septicemia and death. There is no evidence that they lessen the incidence of local infection.

Protein Nutrition in Burned Patients.—Taylor and his associates studied the problem of protein metabolism in burned patients. Hypoproteinemia occurred frequently in a series of 63 patients. In some, hypoproteinemia was fugitive and was probably associated with early loss of plasma. In others, it persisted but later responded to high protein diets of 3,000 calories which contained from 100 to 125 Gm. of protein per day and were supplemented with 25 to 30 Gm. of brewers' yeast and other vitamin supplements. Other patients did not respond to such diets or could not ingest them. This group was composed of the most severely burned and in them the hypoproteinemia became progressive and often reached the anasarca level. A detailed study of nitrogen metabolism has been made on a patient with a burn of 55 per cent of his body surface.

Similar studies have been made on 9 other patients. In severely burned patients there appears to be an excessive loss of nitrogen into the urine in addition to large losses of nitrogen by exudation from the burned surface and an increased nitrogen demand for the building of new tissue. Studies on the patient revealed that nitrogen balance determinations based on urine and stool analyses, together with known nitrogen intake, cannot reveal the considerable nitrogen loss from the burned surface and the demand for building new tissue. On a high protein diet alone this patient developed a protein deficit of 2,000 Gm. The patient's edema increased and it was not until a total nitrogen retention estimated at over 6,000 Gm. of protein had been obtained that the edema was completely relieved and good nutrition obtained. At least 6,000 Gm. of protein was required over and above that indicated by balance studies. In some severely burned patients positive nitrogen balances will be found impossible to maintain from diets alone. In such an event forced alimentation by intubation or by the intravenous administration of amino acids should be attempted as soon as possible. Such protein deficits cannot be replaced by whole blood or plasma transfusions, since it would be necessary to administer 120 liters of plasma to accomplish the equivalent of the supplementary alimentation given. At present the only satisfactory way is forced alimentation by intubation and amino acid administration by vein with proper precautions.

Amino Acids, Serums and Plasma in Replacement Therapy of Fatal Shock.—Elman and Lischer describe hemorrhage in which replacement of the lost blood by an amino acid mixture seemed to have a beneficial effect. The approach has been biochemical rather than physical or physiologic. This is emphasized because amino acid mixtures cannot be regarded as blood substitutes, since they lack the colloidal properties of blood plasma. The value of such injections must depend on the ability of the body to use amino acids to synthesize plasma proteins rapidly or for nutritive or other metabolic purposes. It is theoretically possible for injected amino acids to be made into plasma proteins rapidly and thus act as an indirect substitute or supplement to plasma. The liver is the key organ in this process. Fatal surgical shock in unanesthetized dogs followed bleeding 10 cc. per kilogram of body weight every hour, the mean survival time being 3.6 hours. There was a progressive fall in the blood pressure, in the red cell volume and in plasma albumin and globulin in all experiments. If the blood removed each time was immediately replaced by the same volume of various solutions, significant differences were observed as follows: The survival time was unchanged with dextrose in saline solution, was increased to 4.2 hours with pure amino acids, and was increased to 5.15 with hydrolyzed protein. With citrated plasma or serum, survival time was but 4.5 and 4.6 hours, whereas with heparinized plasma it was 6.0 hours. The fall in blood pressure was greater with citrated plasma and serum than with heparinized plasma, whereas hydrolyzed protein produced less hypotension than dextrose. Study of the changes in red cell volume and in plasma proteins gives some indication that the amino acids of hydrolyzed protein were converted into plasma albumin. Microscopic study of the liver suggests that protein is lost from the hepatic cytoplasm in hemorrhage and that injecting hydrolyzed protein replenishes this loss as compared with experiments in which dextrose was used. It may be inferred that in shock due to repeated hemorrhage a solution containing amino acids and peptides of hydrolyzed protein has a beneficial influence as compared with dextrose and that heparinized is far superior to citrated plasma.

Traumatic Shock.—Fine and his co-workers report a study on the capillary leakage hypothesis in shock utilizing radioactively tagged plasma proteins. By tagging the plasma protein molecule with a radioactive element and introducing such plasma protein into the blood stream, a label is provided by which to identify the movement of plasma proteins. In order to obtain as physiologic a preparation as possible, radioactive cystine was synthesized from radioactive sulfur (eighty day half-life) and was fed to plasma protein deficient dogs, which incorporated the cystine into their own plasma proteins. Plasma protein removed from these dogs was then administered to normal dogs and to dogs shocked by hemorrhage and its rate of escape from the circulation determined. Plasma proteins tagged with radioactive isotopes (S^{35}, Br^{82}, I^{131}) were used to study the capillary leakage hypothesis in hemorrhagic, tourniquet and burn shock. No evidence of leakage due to a change in the permeability of the general capillary bed was found. Tagged plasma proteins escaped into areas of injury in considerable amounts but not into untraumatized areas. There is no evidence to show that the general capillary bed becomes more permeable to plasma proteins or plasma in the late or irreversible phase of shock. Data obtained by the use of radioactively tagged red cells injected intravenously combined with tissue analyses for hemoglobin and tagged red cell content indicate that about one fifth of the capillary blood becomes stagnant or trapped out of active circulation as the shock phase deepens. The progressive decline in shock is not due to a fall in plasma volume but to a fall in the volume of actively circulating plasma. The blood content per gram of tissue is not more and is generally the same, or less, in shock than it is in normal dogs. The therapeutic problem in shock, after adequate replacement of lost blood or plasma has failed, is one of restoring volume and velocity flow through capillaries before the integrity of vital tissue processes is lost.

Archives of Neurology and Psychiatry, Chicago

50:111-232 (Aug.) 1943

Electroencephalographic Classification of Epileptic Patients and Control Subjects. F. A. Gibbs, Erna L. Gibbs and W. G. Lennox.—p. 111.
Anterior Chordotomy: Further Observations on Physiologic Results and Optimum Manner of Performance. O. R. Hyndman and J. Wolkin.—p. 129.
*Metabolic Studies on Epileptic Patients Receiving Azosulfamide and Phenobarbital. M. E. Cohen, F. S. Coombs, S. Cobb and J. H. Talbott.—p. 149.
Mineral Constituents in Blood Serum and Cells of Schizophrenic Patients: Distribution of Sodium, Potassium, Calcium, Magnesium, Inorganic Phosphorus and Chloride. S. Katzenelbogen and Rebecca Snyder.—p. 162.
Measurement of Intellectual Functions in Acute Stage of Head Injury. J. Ruesch and B. E. Moore.—p. 165.
Histogenesis of Early Lesions of Multiple Sclerosis: II. Acute Multiple Sclerosis. I. M. Scheinker.—p. 171.
Electrical Excitation of Cerebral Cortex: Description of New Stimulator. W. E. Rahm Jr. and J. E. Scarff.—p. 183.
Special Hospital in Time of War. W. Penfield and W. V. Cone.—p. 193.

Azosulfamide and Phenobarbital in Epilepsy.—According to Cohen and his associates, azosulfamide has been demonstrated to exhibit anticonvulsant action in patients with epilepsy. Associated with the anticonvulsant effect, alterations in the concentration of chemical constituents of the serum were described. These included a decrease in the carbon dioxide content of the serum, a decrease in the carbon dioxide combining power of the serum and an elevation in serum chlorides. The authors investigated the nature of the metabolic changes associated with ingestion of azosulfamide and with phenobarbital, a drug with anticonvulsant properties. Administration of azosulfamide is accompanied by a decrease in the carbon dioxide content and the carbon dioxide tension of the serum. The decreased carbon dioxide content and the lowered carbon dioxide tension of serum accompany the anticonvulsant effect. The anticonvulsant effect of both azosulfamide and phenobarbital coincides with a positive potassium balance. Ammonium chloride produces the same degree of "acidosis" as does azosulfamide, without alteration of potassium exchange, and does not have an anticonvulsant effect. Phenobarbital produces no "acidosis" but a positive potassium balance and has an anticonvulsant effect. This suggests that "acidosis" is not necessarily the crucial factor in anticonvulsant action.

Archives of Physical Therapy, Chicago

24:449-512 (Aug.) 1943

Influence of Kenny Concept of Acute Poliomyelitis on Physical Treatment Throughout All Stages of Disease. R. L. Bennett.—p. 453.
Analysis of Treatment of Infantile Paralysis: With Comments on Kenny System. A. M. Rechtman.—p. 461.
Future of Rehabilitation. T. C. Foster.—p. 472.
Effect of Therapeutically Administered Carbon Dioxide Inhalation on Respiration in Pulmonary Tuberculosis. A. L. Banyai and G. H. Jurgens.—p. 475.
Control of Peripheral Circulation: Review of Physiologic Literature. K. Harpuder.—p. 481.
Physical Therapy of Peripheral Vascular Disease. H. Warshawsky and Mary W. Dempsey.—p. 487.

California and Western Medicine, San Francisco

59:105-154 (Aug.) 1943

Rheumatic Fever: Its Incidence in Southwestern States. S. J. McClendon.—p. 114.
Disposition of Substandard Military Personnel. W. P. Corr.—p. 116.
Women in Industry: Study of 135 Women Working as Riveters in Aircraft Industries. W. C. Bradbury and C. B. S. Evans.—p. 119.
*Cancer of Uterus: Vaginal Smear in Its Diagnosis. H. F. Traut and G. N. Papanicolaou.—p. 121.
Malignant Tumor of Breast. E. G. Motley and D. A. Harwood. —p. 123.

Vaginal Smear in Diagnosis of Uterine Cancer.—Papanicolaou discovered in the course of routine studies of human vaginal smears not only that the normal cells were shed but that many pathologic cells could be found, among them those of cancer. Papanicolaou and Traut studied thousands of vaginal smears in an attempt to determine the incidence of cancer cells in the vaginal smear as related to the incidence of malignant disease in the uterus, as demonstrable by clinical methods and biopsy technic. The malignant epithelial cells exfoliate from the surface of neoplastic growths much as do normal cells. They float downward into the vaginal fornix, where they accumulate and become mixed with normal cells of epithelial and blood origin, as well as with mucus, bacteria, parasites and cellular débris. The rate of exfoliation of malignant cells seems to be dependent on the rate of growth of the neoplasm and its size. Meticulous scrutiny of the stained smear preparations is an important essential. The vaginal smear presumptive diagnosis should be substantiated by biopsy. The value of the vaginal smear in the diagnosis of cancer of the uterus is that it can be applied to larger numbers of women because of its simplicity and ease of application. The vaginal smear may be made without trauma and thus the danger of dissemination by way of open lymphatics is avoided. The authors found in the course of several thousand examinations 193 instances of carcinoma of the uterus—about 126 lesions involving the cervix and of both the squamous and the adenocarcinomatous types; the remaining 67 were carcinomas of the fundus. The smear showed the presence of cancer of the cervix in all but 1.3 per cent of instances when it was demonstrable by biopsy. Thirteen instances of adenocarcinoma were revealed for the first time by the vaginal smear when no other clinical procedure had sufficed to make the diagnosis. Some of these were early lesions.

Canadian Journal of Public Health, Toronto

34:347-392 (Aug.) 1943

The Blind in Canada. F. S. Burke.—p. 347.
*Immunization Against Influenza A. R. Hare, J. Morgan, Jocelyn Jackson and Dorothy M. Stamatis.—p. 353.
Canada and Tropical Disease. J. L. Little.—p. 360.
Family Roster Service in Lamont Health District. H. Siemens.—p. 364.
Errors in Calculation of Nutritive Value of Food Intake: III. Comparison of Calculated and Determined Amounts of Iron. Constance M. Young and E. W. McHenry.—p. 367.

Immunization Against Influenza A.—Hare and his associates state that a vaccine made by concentrating the virus in allantoic fluid according to the method of Hare, McClelland and Morgan is strongly antigenic and that the serum taken after immunization has a high titer as measured by the agglutinin inhibition test. The levels reached are as high as those reached by patients convalescing from the disease. But whether the immunization had conferred actual immunity cannot be answered until an immunized population is subjected to an epidemic. A higher antibody level is obtained with a concentrated vaccine than with allantoic fluid which has been untreated. There was a possibility that a soluble antigen which may have been present in allantoic fluid but is removed when the vaccine is made might have been of importance. Whether one or two doses of vaccine should be given is a moot point, because the increase in antibody level was in general lower when two doses were given than with only one. The reasons for this are not apparent other than the possibility that there may have been a negative phase in Wright's sense of the term. The use of the concentrated vaccine is not as yet practicable when large numbers are to be immunized. The actual process of concentration is not difficult, but the yield is small. Little more than 7 or 8 cc. of fluid can be collected from each egg, and if this is concentrated ten times it follows that less than 1 cc. of completed vaccine can be obtained from each egg. Unconcentrated vaccine was definitely a less powerful antigenic stimulus than the concentrated, some subjects having scarcely any rise in titer. Should the vaccine doses confer immunity, the problem would be one of production.

Cancer Research, Baltimore

3:569-648 (Sept.) 1943

Infection of Turkeys and Guinea Fowls by Rous Sarcoma Virus and Accompanying Variations of Virus. F. Duran-Reynals.—p. 569.
Growth of Chicken Sarcoma Virus in Chick Embryo in Absence of Neoplasia. J. J. Milford and F. Duran-Reynals.—p. 578.
Studies on Rous Sarcoma Cells Cultivated in Vitro: II. Morphologic Properties of Rous Sarcoma Cells. E. Tenenbaum and L. Doljanski —p. 585.
Further Observations on Skin Carcinogenesis by Single Applicaton of 20-Methylcholanthrene. W. L. Simpson and W. Cramer.—p. 604.
Carcinogenic Activity of Some New Derivatives of Aromatic Hydrocarbons: I. Compounds Related to Chrysene. C. E. Dunlap and S. Warren.—p. 606.
Reported Production of Tumors by Normal Liver Cells of Mice Bearing Tumors Produced by Methylcholanthrene. L. Dmochowski.—p. 608.
Effect of Temperature on Ultraviolet Carcinogenesis with Wavelengths 2,800-3,400 Å. J. A. Bain, H. P. Rusch and B. E. Kline.—p. 610.
Growth and Regression of Frog Kidney Carcinoma Transplanted into Tails of Permanent and Normal Tadpoles. R. Briggs and R. Grant. —p. 613.
Tissue Metabolism Studies on Bone Marrow: Consideration in Relation to Tumor Metabolism. C. O. Warren.—p. 621.

Experimental Medicine and Surgery, Brooklyn

1:229-308 (Aug.) 1943

Croton Oil Shock. B. Kisch and H. Koster.—p. 229.
Hematocrit Readings of Normal Dogs. B. Kisch and E. Strauss. —p. 250.
Action of Sodium Thiosulfate on Blood. J. Litwins, L. J. Boyd and L. Greenwald.—p. 252.
Effect of Sulfonamides on Cerebral and Neuromuscular Actions. D. I. Macht.—p. 260.
Acetylcholine and Mechanism of Nerve Activity. D. Nachmansohn. —p. 273.
On Specificity of Procaine Esterase. B. Kisch.—p. 278.
Experimental Studies on Functional Murmurs and Extra-Sounds of Heart. A. A. Luisada and H. Mautner.—p. 282.
Gelatin Infusion in Hemorrhagic Shock. Martha Janota, H. Necheles, R. E. Weston, V. Weissman and S. O. Levinson.—p. 298.

Journal of Nutrition, Philadelphia.

26:105-218 (Aug.) 1943

Effect of Severe Calcium Deficiency on Pregnancy and Lactation in Rat. Muriel D. D. Boelter and D. M. Greenberg.—p. 105.
*Digestion of Whole Wheat and White Breads in Human Stomach. H. H. Rostorfer, C. D. Kochakian and J. R. Murlin.—p. 123.
Effect of Sodium Chloride on Disposition of Injected Glucose in Strain of Rats. G. Sayers, M. Sayers and J. M. Orten.—p. 139.
Effect of Vitamin D on Calcium Retentions. Hughina McKay, Mary B. Patton, Martha S. Pittman, Genevieve Stearns and N. Edelblute. —p. 153.
Effects of Pantothenic Acid and Inositol Added to Whole Wheat Bread on Evacuation Time, Digestion and Absorption in Upper Gastrointestinal Tract of Dogs. C. G. Bly, F. W. Heggeness and E. S. Nasset.—p. 161.
Further Consideration of Effect of Altitude on Basal Metabolism: Study on Young Women Residents of Denver. R. C. Lewis, Alberta Iliff and Anna Marie Duval.—p. 175.
Study of Availability of Iron in Enriched Bread. H. R. Street. —p. 187.
Prevention of Perosis and Dermatitis in Turkey Poults. H. Patrick, R. V. Boucher, R. A. Dutcher and H. C. Knandel.—p. 197.
Studies on Nutritional Requirements of Rhesus Monkey. H. A. Waisman, A. F. Rasmussen Jr., C. A. Elvehjem and P. F. Clark. —p. 205.

Digestion of Bread in Human Stomach.—Peeled wheat bread made from flour containing all of the wheat kernel except the outer epidermis weighing less than 2 per cent was studied by Rostorfer and his collaborators in comparison with several other breads in experiments on gastric digestion in 6 human subjects. Samples drawn from the stomach by the Rehfuss tube one hour after eating were analyzed for total and free acidity, total solids, pepsin, total and free reducing substance and total and soluble nitrogen. Corrections for time lost in sampling and for free reducing substance and soluble nitrogen in the breads made possible the calculation of rates of carbohydrate and protein gastric digestion. It was found that a small extra amount of pantothenic acid (possibly aided by some other B factor) contained in high vitamin yeast has a favorable effect on digestion at least as great as much larger amounts of the synthetic calcium salt of this acid taken in at least two

doses, one an hour before the test meal and the other eight to ten hours before. Another important observation was with respect to the digestion of starch in breads. The use of high vitamin yeast seems to bring the digestibility of whole wheat bread up to that of white bread. This appears to offer a clue to the preparation of a "successful" whole wheat bread, but the improvement as yet applies only to digestion of "hydrolyzable carbohydrate." Possibly the addition of nonfat milk solids would increase protein digestion (in the stomach) also to the level of that of ordinary white bread. Further experiments are necessary to clarify questions involved in the production of a wholly acceptable whole (98 per cent) wheat bread. In the gastric digests of the whole wheat bread the average pepsin content was approximately 40 per cent greater (Mett tube measurement) than in those of the two white breads. The peptogenic value of whole wheat bread, therefore, is not to blame for lower rates of protein digestion, and such error as results from the small amount of (soluble) nitrogen in the pepsin does not invalidate but rather gives emphasis to the slower rate of gastric digestion of the whole wheat product. The vital economic value of whole wheat as food for man is not touched by these facts, for the over all digestion is sufficiently high to produce a large net saving not only of protein but also of calories from the wheat for human consumption. It appears plausible that the slower rate of digestion of whole wheat in the human stomach as compared with white bread is responsible at least in part for the relative unacceptability of the former by the general public.

Journal of Pediatrics, St. Louis

23:131-250 (Aug.) 1943

Determination of Bone Age in Children: Method Based on Study of 1,129 White Children. L. A. Lurie, S. Levy and M. L. Lurie. —p. 131.
Feet of Normal Children: Study of Lateral X-Ray of Weight-Bearing Foot. M. Robinow, Margaret Johnston and Margaret Anderson. —p. 141.
Significance of Widal Reaction in Enteric Diseases of Children. M. Greenberg.—p. 150.
Meningococcemia. N. Silverthorne.—p. 155.
Postrubella Encephalomyelitis: Report of Cases in Detroit and Review of Literature. F. J. Margolis, J. L. Wilson and F. H. Top.—p. 158.
Effects of Poliomyelitis Virus on Urinary Bladder of Rabbits. J. A. Toomey, J. D. Pilcher and P. T. Rossman.—p. 166.
*Attempts to Recover Poliomyelitis Virus from Fruit, Well Water, Chicken Cords and Dog Stools. J. A. Toomey, W. S. Takacs and Linda A. Tischer.—p. 168.
*Attempts to Isolate Poliomyelitis Virus from Urine. J. A. Toomey, Linda A. Tischer and W. S. Takacs.—p. 172.
Mediastinal Emphysema and Pneumothorax Following Tracheotomy: Report of 4 Cases. G. B. Forbes and G. W. Salmon.—p. 175.
Hemophilus Influenzae Type B Laryngitis with Bacteremia: Report of 4 Cases. P. G. Du Bois and C. A. Aldrich.—p. 184.
Sudden Death in Infants Due to Pneumonia. J. M. Adams.—p. 189.
Wheat Germ Oil (Vitamin E) in Treatment of Congenital Nonobstructive Hydrocephalus. S. Stone.—p. 194.
Chemical and Enzymic Studies of Duodenal Contents of Infants. L. Kajdi and W. C. Davison.—p. 204.
Idiosyncrasy to Metallic Mercury, with Special Reference to Amalgam Fillings in Teeth. M. H. Bass.—p. 215.
Congenital Pulmonary Cysts: Report of Infant Treated by Lobectomy with Recovery. C. C. Fischer, F. Tropea Jr. and C. P. Bailey. —p. 219.
Streamlined Infant Feeding: Feeding Routine Utilizing Earlier Addition of Solid Foods and Fewer Feedings. N. W. Clein.—p. 224.

Attempts to Recover Poliomyelitis Virus.—Toomey and his associates attempted to recover poliomyelitis virus from fruit (washings), well water, stools from sick dogs and cords from paralyzed chickens found in vicinities where human poliomyelitis had occurred. Although the virus may have been present in the specimens tested, its existence could not be demonstrated when either the eastern cotton rat or the Macaca mulatta monkey was used as the test animal.

Attempts to Isolate Poliomyelitis Virus from Urine.—Toomey and his collaborators tried to demonstrate the virus of poliomyelitis in the urine of patients with bladder paralysis. Their attempt was a failure when the monkey was used as the test animal, even though such specimens were obtained at an optimal time; that is, coincident with the onset of the paralysis. Urine obtained post mortem from the bladders of poliomyelitis patients was tested for the presence of the virus on eastern cotton rats. These tests also gave negative results.

Journal of Thoracic Surgery, St. Louis

12:503-606 (Aug.) 1943

Bronchogenic Cysts of Mediastinum, with Report of 3 Cases. W. E. Adams and T. F. Thornton.—p. 503.
Decompression of Heart in Severe Scoliosis: Report of Case. C. R. Lam and R. D. McClure.—p. 517.
Surgical Anatomy of Bronchi and Vessels. L. Miscall and C. M. Cornell.—p. 526.
Preliminary Phrenic Vagus Inhibition in Thoracic Surgery. J. Arce and M. M. Brea.—p. 544.
Accessory Pulmonary Artery Probably Arising from Abdominal Aorta. J. Arce.—p. 548.
Operation Performed in One Stage with Inhalation Anesthesia for Hydatid Cysts of Lung, Free of Adhesions. A. Ceballos.—p. 553.
Experiments in Intracardiac Surgery: II. Intracardiac Visualization. D. E. Harken and Evelyn M. Glidden.—p. 566.
Postoperative Disturbances of Respiratory Mobility. L. Hofbauer. —p. 573.
Artificial Pneumothorax: Nonstatistical Analysis of Major Factors Involved in Its Proper Management. T. N. Rafferty.—p. 578.
Major Surgery in Amyloidosis. J. M. Beardsley—p. 590.
Putrid Empyema. I. Kross.—p. 601.

Journal of Urology, Baltimore

50:1-122 (July) 1943

Management of Hydronephrosis Due to Ureteropelvic Obstruction: Preliminary Report. R. B. Henline and J. H. Menning.—p. 1.
Renal Ectopia: Report of 2 Cases with New Method of X-Raying Pelvic Ectopia. N. S. Scarcello.—p. 25.
Primary Actinomycosis of Kidney: Case Report. D. L. Cohen.—p. 29.
Results of Surgical Treatment of Diffuse Glomerular Nephritis. C. L. Onell and I. Diaz Muñoz.—p. 34.
Transvesical (Suprapubic) Closure of Vesicovaginal Fistula. W. Valmé.—p. 40.
Review of Primary Carcinoma of Ureter: Presenting 2 Cases. W. W. Scott.—p. 45.
Synthetic Hydrocarbon for Relief of Ureteral Spasm. H. G. Lund and F. G. Zingal.—p. 65.
Report of Case of Bilharziasis. J. C. Burt, C. M. Lane and J. L. Hamilton.—p. 68.
*Absorption of Protein from Urinary Bladder. L. H. Baretz, M. Harten and M. Walzer.—p. 71.
Clinical Study of Obscure Bladder Disease Using Frei Tests. V. F. Marshall and Ellora Endicott.—p. 76.
*Postmortem Findings in Carcinoma of Prostate Following Castration and Diethylstilbestrol Therapy: Case Report with Autopsy and Postmortem Tissue Acid Phosphatase Studies. G. G. Gilbert and G. Margolis.—p. 82.
Paravesical Appendical Abscess with Report of an Unusual Case of an Old Appendical Abscess with Symptoms of Prostatism. J. A. Lazarus.—p. 95.
Further Modification of Foley and Alcock-Foley Retention and Hemostatic Catheters. M. Wolf.—p. 100.
Mixed Leiomyoma and Lymphangioma of Epididymis. S. Malisoff and M. Helpern.—p. 104.
Formation of Urinary Calculi. H. K. Lassen.—p. 110.
Simple Aid for Testicular Biopsy. N. C. Schlossmann.—p. 121.

Absorption of Protein from Urinary Bladder.—Baretz and his associates state that various dyes, anesthetics, drugs, urea and urinary constituents are absorbed from the urinary bladder of man, dog, cat, guinea pig and rabbit. In the present study a direct immunologic technic has been used to study the absorption of protein from the urinary bladder. Specific excitation of a passively sensitized cutaneous site was induced by oral administration of the related antigen. Studies with this method revealed that the absorption of unaltered protein occurred with physiologic regularity following oral, intraduodenal and rectal administrations of the protein and on introduction of the protein into the cervix and vagina. Experiments are described which demonstrate that absorption of traces of unaltered protein from the urinary bladder does occur. The choice of cottonseed as the antigen to be studied was determined by the availability of a serum which was particularly suitable for this purpose. This sensitizing serum was obtained from a patient with a high degree of cutaneous sensitivity to cottonseed. The uniformly positive results obtained with this simple immunologic technic in monkeys and in man clearly establish the fact that detectable traces of protein are absorbed from the urinary bladder. This organ must therefore be considered as a possible site of absorption of allergenic substances introduced into the bladder for therapeutic or diagnostic purposes. Such traces of absorbed protein are more than sufficient to produce severe reactions in individuals who are sensitive to the allergen employed. In contrast to previously reported technics which depended on chemical tests and on delayed immunologic responses to the introduced protein, the technic herein described permits almost immediate detection of the entrance of the protein into the circulation.

Postmortem Findings in Carcinoma of Prostate.—Gilbert and Margolis report a case of carcinoma of the prostate treated by transurethral resection, castration and diethylstilbestrol. This case is quite similar to the reported cases of delayed failure following castration for prostatic carcinoma. There was a temporary phase of improvement during which there was relief from pain, a decrease in the size and degree of induration of the prostate, and regression of lung metastases. This was followed by a period in which the tumor was refractive to diethylstilbestrol therapy, progressed rapidly and yet remained clinically quiescent in the prostate and in the lungs. The serum acid and alkaline phosphatase values in this case roughly paralleled the course of the disease.

New York State Journal of Medicine, New York

43:1375-1470 (Aug. 1) 1943

Physical Therapy in Peripheral Nerve Injuries. R. Kovács.—p. 1403.
Sulfonamide Therapy of Ocular Infections. P. Thygeson and W. Stone Jr.—p. 1409.
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Treatment of Angina Pectoris by Testosterone Propionate.—L. H. Sigler and J. Tulgan.—p. 1424.
Intracranial Arteriography with Rapidly Excreted Iodine Compound (Diodrast). J. L. Pool and S. Alexander.—p. 1429.

43:1471-1566 (Aug. 15) 1943

Danger of Cutaneous Reactions to Sulfonamides: Report of 2 Cases of Bullous Eruption Following Use of Sulfanilamide, One of Which Resembled Pemphigus Vulgaris. D. Bloom.—p. 1499.
Tropical Diseases—Postwar Health Problem. T. T. Mackie.—p. 1509.
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Vaginal Antisepsis During Labor. H. W. Mayes.—p. 1518.
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Unusual Case of Undulant Fever with Postoperative Pyrexia. M. H. Morris.—p. 1538.

Surgery, St. Louis

14:157-320 (Aug.) 1943

Nonoperative Treatment of Cardiac Tamponade Resulting from Wounds of Heart. A. Blalock and M. M. Ravitch.—p. 157.
Nonpenetrating Abdominal Trauma. E. C. Kelly.—p. 163.
Therapy of Shock in Experimental Animals with Serum Protein Solutions. E. E. Muirhead, C. T. Ashworth, L. A. Kregel and J. M. Hill. —p. 171.
*Clinical Experience with Thrombin as a Hemostatic Agent. R. T. Tidrick, W. H. Seegers and E. D. Warner.—p. 191.
Metabolic Studies in Patients with Cancer of Gastrointestinal Tract. P. E. Rekers, G. T. Pack and C. P. Rhoads.—p. 197.
*Unilateral Decapsulation of Kidney for Transfusion Oliguria. S. C. Flo and H. W. Cummings.—p. 216.
Urinary Retention Following Combined Abdominoperineal Resection. F. A. Coller and P. F. Eastman.—p. 223.
Tissue Reactions to Medicaments Used in Local Treatment of Burns. M. E. Maun, R. C. Schneider, M. A. Pilling and J. W. Hirshfeld. —p. 229.
Relationship of Acute Anemia to Wound Healing: Experimental Study. E. L. Besser and J. L. Ehrenhaft.—p. 239.
Malignant Neoplasms of Spleen: Review of Literature and Report of Case of Primary Lymphosarcoma (Reticulum Cell Type). P. F. Hausmann and F. W. Gaarde.—p. 246.
Curare in Treatment of Tetanus: Case Report. S. C. Cullen and C. S. Quinn.—p. 256.
Curare for Improvement of Abdominal Muscle Relaxation During Inhalation Anesthesia: Report on 131 Cases. S. C. Cullen.—p. 261.
Preliminary Observations Concerning Paraveretebral Injection of Sympathetic System in Hypertension. H. G. Schwartz and T. Findley. —p. 267.
Traumatic Rupture of Duodenum: With Case Report. J. Sarnoff and B. H. Oremland.—p. 272.
Traumatic Chylothorax: Case Treated with Intravenous Chyle. E. Schnug and J. Ransohoff.—p. 278.
*Carcinoma of Parathyroid Gland. K. A. Meyer and A. B. Ragins. —p. 282.
Arteriovenous Fistula of Common Femoral Vessels with Extreme Dilatation of External Iliac Vein: Report of Case. J. R. Watson and R. B. Miller.—p. 296.
Leg Ulcers as Complication of Caisson Disease. S. T. Glasser.—p. 302.
New Simple and Rapid Method for Hernial Sac Ligation. R. Lich Jr. and R. B. Samson.—p. 306.

Thrombin as Hemostatic Agent.—Tidrick and his co-workers present a summary of clinical results obtained with the preparation "thrombin topical." Each vial contains approximately 10,000 units (the thrombin unit is defined as the amount required to clot 1 cc. of standard fibrinogen solution in fifteen seconds). Thrombin has been employed in over 225 cases in the University Hospitals of Iowa City. The largest group consisted of 102 cases in which thrombin was used to control operative bleeding from donor skin graft sites. In 27 cases thrombin has been employed in the control of operative bleeding from cancellous or cortical bone. Thrombin was used also during cholecystectomy, in the Rammstedt pyloroplasty procedure, to control oozing from mastectomy skin flaps, following biopsy or traumatic wounds in cases of blood dyscrasia, in delayed postoperative bleeding, and in miscellaneous cases of soft tissue bleeding. The use of sulfonamide drugs in the wound is not a contraindication to the simultaneous use of thrombin, nor do the drugs interfere with the hemostatic action of the thrombin preparation. Thrombin provides a useful adjunct to surgical technic. Oozing of blood from capillaries and small venules can be checked promptly whenever the bleeding surfaces are accessible. Even in the case of small arteries application of thrombin is often effective, particularly if digital pressure can be applied to the bleeding points momentarily in order to permit the clot to become firmly anchored in the tissue. There has been no evidence that the thrombin produced local irritation or that patients for whom the preparation was used repeatedly became hypersensitive to it. None of the patients showed evidence of untoward effects from absorption of the thrombin or from local thrombosis of vessels.

Unilateral Decapsulation of Kidney for Transfusion Oliguria.—Flo and Cummings report a case of post-transfusion reaction which was apparently cured by unilateral decapsulation of a kidney. Since the condition was becoming progressively worse and spontaneous recovery was despaired of, they felt that a unilateral decapsulation would do less harm than a bilateral one. If a unilateral decapsulation will break the vicious chain of events, this is the procedure of choice, especially in view of the damage to the kidney such an operation must entail.

Carcinoma of Parathyroid Gland.—Meyer and Ragins present a detailed account of a case of carcinoma of the thyroid gland with postmortem observations. There was only a temporary improvement in the objective and subjective symptoms following extirpation of the tumor mass some twenty-six months before death. Eight months after the operation the subjective symptoms reappeared, and a year later the fibrocystic changes of the bone became progressively worse, despite x-ray irradiation to tumor mass and bone. This was followed by a number of pathologic fractures. Six weeks before death the serum phosphorus rose to 10 mg., indicating renal decompensation. The postmortem examination revealed a recurrent carcinoma of the parathyroid gland with metastasis to the peritracheal, subclavicular and perijugular lymph nodes, the lungs and the right kidney; generalized osteitis, fibrosis cystica of the bones; bilateral nephrolithiasis, bilateral chronic ascending pyelonephritis, left pyonephrosis with atrophy of the renal cortex and nephrocalcinosis.

Virginia Medical Monthly, Richmond

70:433-484 (Sept.) 1943

Infants of Diabetic Mothers. Priscilla White.—p. 436.
Pregnancy and Diabetes. W. R. Jordan.—p. 441.
Treatment of Ureteral Calculi. A. I. Dodson and H. C. Lee.—p. 444.
Problem of the Civilian Maladjusted. D. C. Wilson.—p. 449.
Treatment of Eclampsia with Veratrum Viride. J. M. Whitfield.—p. 452.
*Hookworm Disease. T. R. Littlejohn.—p. 455.
Hepatic Function in Acute Cholangitis: Case Report. N. Bloom. —p. 457.

Hookworm Disease.—Littlejohn shows that some cases of hookworm disease are mistaken for other disorders such as peptic ulcer or appendicitis, and unjustifiable operations are performed. He reviews a number of case histories in which hookworm would probably not have been discovered had it not been for making simple routine laboratory examination. He stresses that all patients with chronic pain in the upper abdomen, especially with an increase of the eosinophil count, should be examined for hookworm ova. The thymol treatment is the least toxic and the most effective.

West Virginia Medical Journal, Charleston

39:265-296 (Aug.) 1943

Epidemic Keratoconjunctivitis. F. V. Gammage.—p. 265.
Diagnosis and Treatment of Nasal Sinus Diseases in Relation to Eye. H. M. Goodyear.—p. 270.
Penicillin and Other Mold Derivatives. G. A. Bergy.—p. 272.
Abdominal Pregnancy: Report of Case. A. P. Hudgins.—p. 277.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Australian J. Exper. Biol. and M. Science, Adelaide

21:55-132 (June) 1943

Changes in Influenza Virus Associated with Adaptation to Passage in Chick Embryos. F. M. Burnet and Diana R. Bull.—p. 55.
Titration of Antibody Against Influenza Viruses by Allantoic Inoculation of Developing Chick Embryo. F. M. Burnet and W. I. B. Beveridge.—p. 71.
Studies on Clostridium Oedematiens Group: 1. H and O Antigenic Analysis. A. W. Turner and Catharine E. Eales.—p. 79.
Studies in Physiology of Host-Parasite Relations: 4. Some Effects of Tomato Spotted Wilt on Growth. B. J. Grieve.—p. 89.
Hemagglutination by Viruses: Range of Susceptible Cells with Special Reference to Agglutination by Vaccinia Virus. Ellen Clark and F. P. O. Nagler.—p. 103.
Incubation Period of Eggs of Halotydeus Destructor Tucker (Acarina) at Different Temperatures. J. Davidson and D. C. Swan.—p. 107.
Germinating Seeds as Source of Vitamin C in Human Nutrition: 1. Ascorbic and Dehydroascorbic Acid Contents of Several Varieties of Seeds Germinating Under Standard Conditions for Varying Periods of Time. J. W. H. Lugg and R. A. Weller.—p. 111.
"Nervous Distemper" in Dogs: Pathologic and Experimental Study, with Some Reference to Demyelinating Diseases in General. E. W. Hurst, Barbara Ternent Cooke and P. Melvin.—p. 115.
Antibacterial Substances Produced by Molds: 3. Detection and Estimation of Antibacterial Activity in Vitro. Nancy Atkinson.—p. 127.

British Journal of Experimental Pathology, London

24:81-132 (June) 1943

Protective Properties of Alpha Antitoxin and Theta Antihaemolysin Occurring in Clostridium Welchi Type A Antiserum. D. G. Evans.—p. 81.
Examination of Relationship Between Bacteriostatic Activity and Normal Reduction Potentials of Substituted Quinones. J. E. Page and F. A. Robinson.—p. 89.
Fixation of Foreign Material in Inflamed Tissue, with Especial Reference to Action of Clostridium Welchi Toxin and Antitoxin. A. A. Miles and E. M. Miles.—p. 95.
Helvolic Acid, an Antibiotic Produced by Aspergillus Fumigatus, Mut. Helvola Yuill. E. Chain, H. W. Florey, M. A. Jennings and T. I. Williams.—p. 108.
Note on Crystallography of Helvolic Acid and Methyl Ester of Helvolic Acid. D. M. Crowfoot and B. W. Low.—p. 120.
*Serologic Specificity of Autoantibody in Atypical Pneumonia. J. C. Turner and E. B. Jackson.—p. 121.
Some Investigations on Nature of Resistance of Inbred Line of Fowls to Development of Rous No. 1 Sarcoma. J. G. Carr.—p. 127.

Serologic Specificity of Autoantibody in Atypical Pneumonia.—The existence of a relationship between atypical pneumonia and the cold agglutinins was pointed out by Turner in an earlier report. More recently a comprehensive investigation of the behavior of the cold agglutinins in a variety of infectious diseases revealed the aspect which seemed to be the key to its clinical and immunologic significance. This was the demonstration that the titer of cold agglutinins for the human erythrocyte rises in atypical pneumonia during the second week after the onset of respiratory symptoms in the fashion of specific immune antibodies. Abnormal amounts of cold agglutinin developed in more than 90 per cent of a group of cases of atypical pneumonia seen in the British Isles during the winter of 1942-1943. Thus, even though the infectious agent in this disease remains unknown except in the negative sense that it is probably not bacterial, a simple serologic principle for the delineation and classification of a current type of respiratory disease has been laid down. The authors examined the cold agglutinin of atypical pneumonia for serologic specificity by the methods of selective absorption and titration of activity on the erythrocytes of several species. It was found that the agglutinin has the properties of autoantibody and reacts equally with cells representing all four major human blood groups. When isolated by absorption the autoagglutinin exhibits a limited action on the erythrocytes of lower animals, having appreciable effect on rabbit cells only. It is suggested that this specificity may be explained by the existence of a heterogenic antigen shared by man and rabbit.

Glasgow Medical Journal

22:1-32 (July) 1943

Genesis of Human Voice. J. Donald.—p. 1.
Knee Injuries in the Army. J. C. Alexander.—p. 12.
Primary Thrombosis of Axillary Vein: Report of 3 Cases. A. Lyall.—p. 16.

Guy's Hospital Reports, London

91:111-170 (Nos. 3 and 4) 1942

Observations on Anatomy of Bronchial Tree, with Special Reference to Surgery of Lung Abscess. R. C. Brock.—p. 111.
Bronchial Embolism and Posture in Relation to Lung Abscess. R. C. Brock, F. Hodgkiss and H. O. Jones.—p. 131.
Level of Interlobar Fissures of Lungs. R. C. Brock.—p. 140.
Rectal Pain. J. A. Ryle.—p. 147.
Leiomyoma of Stomach with Report of Case. N. L. Eckhoff.—p. 153.
Note on Syme's Amputation with Report of Case of Forty Years' Duration. F. R. Kilpatrick.—p. 157.
Case of Squamous Cell Carcinoma of Ovary. R. E. Rewell.—p. 163.

Lancet, London

2:147-178 (Aug. 7) 1943

Shock Producing Factor(s) from Striated Muscle: I. Isolation and Biologic Properties. H. N. Green.—p. 147.
Id.: II. Fractionation, Chemical Properties and Effective Doses. Marian Bielschowsky and H. N. Green.—p. 153.
Serial Spinal Analgesia. J. A. Lee.—p. 156.
Dogs as Source of Leptospiral Infection in Man. A. D. Gardner.—p. 157.
Sudden Senescence. R. Greene and A. S. Paterson.—p. 158.
Purpura of Skin: Review of 500 Cases. E. Davis.—p. 160.
*Emergency Treatment of Smashed In Face: Value of Tracheotomy and Laryngotomy. D. H. Patey and E. W. Riches.—p. 161.

Emergency Treatment of Smashed In Face.—According to Patey and Riches the smashed in face resulting from a severe blunt external force is emerging as a clinical entity. With the motor car and airplane as common agents in its production it is essentially an injury of modern civilization. The duties of the emergency surgeon in these cases are to deal with hemorrhage and gross soft tissue and bony damage, to inspect the eyes and, if necessary, to secure the cooperation of the ophthalmic surgeon, to be on the lookout for any suggestion of cerebrospinal rhinorrhea and to administer prophylactic sulfonamides. Anesthesia of the patient with smashed in face presents difficulties. Inhalation anesthesia through a facial mask is difficult not only because of the facial injuries but because of the blood which is constantly running into the pharynx and leading to coughing and partial obstruction. If the patient is anesthetized past the stage of the cough reflex, he tends to aspirate the blood into his lungs and may drown in his own blood. In this event the patient can be saved from death by asphyxia only by a rapid tracheotomy. Intravenous anesthesia might be thought to solve the difficulties, but asphyxial symptoms have been known to develop so quickly after intravenous injection that the patient's life was saved only by a rapid plunge laryngotomy. The author suggests that the initial emergency treatment of the severe types of smashed in face should be tracheotomy or laryngotomy under local anesthesia. Once an opening into the air passages has been made, the anesthetic problem becomes easy, the danger of death from asphyxia is averted, and the reduction in cyanosis from the establishment of a free airway may by itself result in cessation of much of the hemorrhage.

South African Medical Journal, Cape Town

17:167-182 (June 12) 1943

South African Native Health and Medical Service. H. S. Gear.—p. 167.
*Outbreaks of Dysentery at Military Hospital in South Africa. M. H. Finlayson.—p. 173.
Improved Technic for Vi Agglutination. A. Pijper, Clarice G. Crocker and Janet Todd.—p. 175.
Case of Dysgerminoma of Ovary. J. Black and O. S. Heyns.—p. 177.
Epidemiologic Observations on Outbreak of Tick Relapsing Fever in Northern Transvaal. D. Ordman.—p. 180.

Dysentery in South Africa.—Finlayson reports that shortly after the opening of a military hospital cases of "gastroenteritis" were observed among the patients and staff. There were two clinical types—the one type, in which the patient passed from three to twenty liquid stools in twenty-four hours and after about twenty-four to forty-eight hours appeared to recover completely; the second type, in which the attack was usually ushered in by violent vomiting and frequent loose stools, persisting for seven or eight days. The latter type did not occur among bed patients but was noted among the staff and convalescent patients who were not confined to the hospital premises. The microscopic appearance of the stools made possible a diagnosis of bacillary dysentery long before the causative organisms were isolated. The stool examinations were

carried out by the methods described by Finlayson in 1941. It was observed that although Bacterium sonnei was isolated from outbreaks of dysentery occurring among the staff and from sporadic cases occurring among convalescent patients who were allowed leave from the hospital, this organism was not once isolated among patients confined to bed. In all bed patients who acquired a dysenteric infection at the hospital the organism isolated was identified as of the Bacterium flexneri group. The results of examinations of various foodstuffs were all negative. Since epidemiologic data pointed to milk as a possible vehicle of infection, it was examined and on four occasions bacilli with the characters of B. flexneri were isolated. Instructions were issued for all milk to be boiled. In spite of these instructions, cases of dysentery from which B. flexneri was isolated continued to occur among the bed patients. It was noted that these cases were occurring only among persons whose diet contained a high proportion of cream which was neither pasteurized nor boiled. The use of cream was prohibited, and since then no case of dysentery has occurred. Bevan in 1941 had shown that the chief cause of infantile mortality in South Africa is "infantile diarrhea." There is no doubt that this condition is a dysentery. The importance of boiling all milk unless pasteurized cannot be overemphasized. The average South African native looks on a mild dysentery as being more beneficial than otherwise. As the bulk of the milk supplies is handled by natives, it is not difficult to conceive how milk can be infected by a milk handler who may be a carrier of dysentery bacilli.

Schweizerische medizinische Wochenschrift, Basel

72:1429-1456 (Dec. 26) 1942. **Partial Index**

Reading of Roentgenograms. W. Jaeger.—p. 1429.
Corpus Luteum and Vitamin E in Imminent and Habitual Abortion. F. Ludwig.—p. 1431.
Galactorrhea and Corpus Luteum. C. Müller.—p. 1433.
Acute Yellow Atrophy of Liver During Childhood. O. Geiser.—p. 1434.
*Desert Sore. A. L. Vischer.—p. 1436.
Technic of Blood Transfusion and Intravenous Drip in Infants and Small Children. Margrit Esser.—p. 1438.

Desert Sore.—Vischer states that desert sore, or "Gallipoli sore," observed during the first world war in British troops in Palestine and at the Dardanelles, was seen by him recently among German and Italian prisoners of war in Egypt. These pyodermic sores resemble somewhat varicose crural ulcers except that they are found not only on the legs but also on the knees, hands, arms and the head. The sores are usually initiated by insect bites or scratches and begin as papules which become fairly large blisters containing first a yellowish and later a turbid secretion. When these blisters burst, slowly growing and profusely secreting ulcers form. The healing process is extremely slow. The sores occur chiefly during the summer, when insects are most annoying. The fact that lack of water in the desert prevents the cleansing of the sweat saturated skin is probably a factor. Troops whose general condition has been impaired by great exertion and desert heat seem to be especially subject. The native Arabs and native Lybian soldiers are free from them; they are somewhat less frequent in Italian than in German and British soldiers. The bacteriologic examination of the ulcers reveals chiefly staphylococci and streptococci and occasionally diphtheria bacilli. The diphtherically infected ulcer has a dirty gray coating and occurs as a rule only when pharyngeal diphtheria exists among the troops. Diphtherial ulcers are followed by paralysis, sometimes two or three weeks after healing. Immobilization of the involved area promotes healing of the sore. Prompt attention to small epithelial lesions prevents them. In South Africa desert sore is known under the term "veldt sore." Other terms for it are barcoo rot or septic sore.

Bol. de la Asoc. Méd. de Puerto Rico, Santurce

35:215-252 (June) 1943. **Partial Index**

Modified Friedman's Test for Pregnancy: Preliminary Report. R. J. Stokes and J. E. Ortiz.—p. 215.
*Vogt-Koyanagi's Syndrome. L. J. Montalvo Durand.—p. 218.

Vogt-Koyanagi's Syndrome.—According to Montalvo Durand this syndrome is rare. The most important symptoms are nontraumatic bilateral uveitis, premature graying, alopecia, symmetrical vitiligo, especially on the hands, wrists and feet and dysacousia. The cause is unknown. Japan is the place of greatest incidence. The disease develops most frequently in persons between 30 and 40. Syphilis and tuberculosis have a certain contributory significance in the development of the disease.

Klinische Wochenschrift, Berlin

21:425-444 (May 9) 1942. **Partial Index**

*Administration of Vitamin K in Hepatic Function Test. L. Armentano and F. Géher.—p. 425.
Effect of Mannitol on Liver. G. Sabatini and D. Gigante.—p. 429.
Toxic Effect of Extracts from Posterior Lobe of Hypophysis. E. Wefle, O. Koch and H. Voss.—p. 431.
Biologic Mode of Reaction of Serosa Epithelium. K. Niessing.—p. 432.
Preliminary Report of Results of Pulmonary Function Test in Bechterew's Disease. W. Zens and F. Peters.—p. 435.
Importance of Carbonic Acid in Blood Coagulation. F. Widenbauer and Ch. Reichel.—p. 436.

Administration of Vitamin K in Hepatic Function Test.—Armentano and Géher used Koller's vitamin K test as a test of hepatic function. In the majority of cases of obstructive jaundice the prothrombin time was restored to normal within twenty-four hours after administration of vitamin K. There were isolated cases in which the normal value could be obtained only after repeated administration of vitamin K in the course of three days. Normal values in hepatocellular jaundice, provided the prothrombin values are very low, may be obtained only after all symptoms of the disease have disappeared. Existence of a severe hepatocellular icterus is suggested when prolonged prothrombin time is not restored to normal by one to three vitamin K injections (30 mg. for each of them). Low prothrombin levels were not demonstrated in all of the cases with partial obstruction of the common bile duct. In obstruction by stones associated with cholangitis the prolonged prothrombin time can be restored to normal by methenamine injections, which result in liberation of vitamin K following the destruction of colon bacilli. In cases with cardiac decompensation and enlarged liver low prothrombin values are found which were spontaneously increased with restitution of compensation. Failure to restore compensation by administration of vitamin K may signify the presence of a beginning cirrhosis. A true picture of the prothrombin amount is revealed on determination of the prothrombin curve. That is particularly demonstrated in chronic hepatocellular icterus. Prothrombin values below 20 per cent are not always associated with spontaneous hemorrhages. These may be caused not only by lack of prothrombin but also by the increased permeability of capillaries. The prothrombin time was demonstrated to be normal in cases of symptomatic hemophilia and in all cases of hemorrhagic diathesis with the exception of 1 case of thrombopenic purpura. The shortest prothrombin time was found in a case of hemophilia. The prognostic value of the vitamin K test in liver disease is emphasized. Recovery occurred in all cases with normal prothrombin time and in cases in which prothrombin time was readily restored to normal by vitamin K administration. Yellow atrophy of the liver was suspected in a case with a low prothrombin level. Clinical signs of the condition became manifest somewhat later.

Medicina Española, Valencia

6:375-500 (April) 1943. **Partial Index**

*Parathyroprival Tetany. J. A. Lamelas, Diaz Prieto y Rábago.—p. 376.
Postarthritic Static Defects. J. Carrera Lorenzo.—p. 389.
Menopausal Psychosis. D. T. Alcober.—p. 394.
Deficiencies Caused by Medical Diets. T. Cerviá.—p. 400.
Infantile Kala-Azar, Antimony and Reticuloendothelial System. J. Boix Barrios.—p. 412.
Late Results of Radium Therapy of Cancer of Uterus. S. Monmeneu Jorro.—p. 446.
Hemianopsia Caused by Lesion of Posterior Cerebral Artery. E. Arqués Gironés.—p. 456.
"Stuka" Treatment of Blenorrhagia. P. Navarro Sala.—p. 460.

Parathyroprival Tetany.—Lamelas and his collaborators review the etiology and pathogenesis of parathyroprival tetany and report 2 cases which occurred among 87 persons operated on for goiter. The incidence of postoperative tetany, as reported by other surgeons, varies between 0.5 and 3.4 per cent. The authors evaluate treatment with parathyroid injection, with dihydrotachysterol, with vitamin D in the form of calciferol and with calcium. In mild cases a lactovegetarian diet together with calcium chloride or calcium lactate and vitamin D is sufficient; in severe cases and during attacks, parathyroid injection or dihydrotachysterol should be employed.

Book Notices

Stuttering: Significant Theories and Therapies. By Eugene F. Hahn. Foreword by Sara Stinchfield Hawk. Cloth. Price, $2. Pp. 177. Stanford University: Stanford University Press; London: Oxford University Press, 1943.

This is an important book. The author has achieved a number of desirable ends in his compilation of the various theories of and therapies for stuttering. He has selected almost all the authorities in the field of speech pathology, including eight from abroad, and to assure the complete accuracy of his data he has had them either write their own digests of their respective points of view or edit the digests which he prepared. It is not within the province of a reviewer to go into the merits of the different theories and therapies discussed. However, a few examples of the diverse procedures employed in treating stutterers—loud sighs; "release of the adduction action of the vocal cords; thought training exercises; "breath chewing"; psychoanalysis; building up visualization; building up a one-lead dominance; voluntary stuttering; acquiring "skill in controlling the form and duration of the stuttering reaction"; influencing the disturbed metabolic mechanism of the stutterer—will give the reader some idea of the confusion which exists in the field. The twenty-five digests are clearly and concisely written and, in toto, present an excellent summary of all the important theories on stuttering. An appendix and an index complete the book. In the appendix the author stresses the advisability of employing a variety of therapeutic measures in the treatment of the stutterer and gives in detail a number of clinical procedures which he and others have found useful. Thus the book offers much valuable material to the teacher or clinician who wishes to correlate theory and practice. This volume should be required background reading for all who are interested in the stutterer's problem. In fact, the authorities whose theories are presented in the book should have it on their "must" list. Comparative study is an important step toward clarification.

These Mysterious Rays: A Nontechnical Discussion of the Uses of X-Rays and Radium, Chiefly in Medicine. By Alan L. Hart, M.D., M.Sc. (Med.). Cloth. Price, $2.75. Pp. 218, with 28 illustrations. New York & London: Harper & Brothers, 1943.

No doubt many radiologists have wished they might write a popular book on x-rays which would be acceptable to the medical profession and provide attractive reading for the public. The author has succeeded enviably well in combining skill in writing with a vision born of long experience to produce a highly readable and dependable book on radiology for popular consumption. It sets forth important facts regarding diagnostic and therapeutic radiology in nearly nontechnical language. The author has succeeded in taking much of the mystery out of the topic by the use of a clever conversational style. There is a general discussion on the employment of the x-rays and radium in medicine and a general review of the problem of cancer, the use of ultraviolet radiation and the application of x-rays and radium in industry and certain medicolegal topics. Practical advice is given concerning cancer quacks and commercial x-ray laboratories. The author has done radiology a great service in providing this convenient and useful volume. It would be a valuable and popular addition to the literature on the waiting room table in any radiologist's office.

Medical Parasitology: A Laboratory Manual. By I. Jacques Yetwin, B.Sc., M.S., M.D., Associate Professor of Parasitology, Middlesex University School of Medicine, Waltham, Mass. Third edition. Paper. Pp. 130, with 62 illustrations. Waltham, Mass.: The Author, 1943.

This loose-leaf booklet is printed as a guide to a twenty hour course in parasitology for medical students. Numerous blank pages are interspersed for lecture and laboratory notes. Sixty-two illustrations accompany the directions for laboratory exercises. Morphologic details and parasites of little or no medical importance receive undue emphasis. Instead, greater stress could well have been given to the life cycles and methods of diagnosis of the important parasites. It is unlikely that this manual will be of much value to any students other than those taking the particular course for which the directions were written.

A Workbook of Elementary Pharmacology and Therapeutics (Including Drugs and Solutions). By Luella C. Smith, R.N., B.S., Instructor in Science, Methodist Hospital, Indianapolis. Second edition. Paper. Price, $2. Pp. 300. St. Louis: C. V. Mosby Company, 1943.

This embryonic manual gives a sad impression of grade and high school education. That so much drill in simple arithmetic is needed is a sad commentary. The book has 300 pages, of which 184 are occupied with such diversions as changing ¾ to percentage or answering "How much 10 per cent sodium bicarbonate is needed to make a quart of 5 per cent?" Ignorance of simple arithmetic has been found also in pharmacy, in dentistry and in medicine. Yet the demands for entrance would qualify for a university president. Since the book deals with remedies and their administration, one may wonder why there is no suggestion of how to stimulate better scholarship in the grade and high school, such as the elimination of coddling devices and the introduction of means of promoting toil, sweat and study.

Teachers in all schools are aware of the deficiencies in the students, and to give credit where due we think that the training, though quite deficient, is better than in the past and is improving. The author recognizes the student's deficiency and instead of useless fault finding sets out to correct it.

The book is divided into thirty-eight chapters or exercises, very elementary, yet important. Addition, subtraction, simple fractions, multiplication, division, improper fractions and similar grade school work is reviewed. More pertinent is the work on weights and measures, and the relationship of the metric and apothecary systems.

Because some doctors write prescriptions in Latin, she gives a list of abbreviations and their meaning but the connection between the abbreviation and the Latin words is a void, and the whole devoid of anything educational.

Medical men are to blame for much of this nonsense. And, strange to say, medical men who best know Latin use it least. They have the good sense to keep dark the fact that if they are Latin scholars it usually is at the expense of less knowledge of medicine and pharmacology.

The greatest service of this work book is in illustrating defects in our whole system of education. The author sees students as they are, not as their qualifications state. Recognizing their deficiencies, she applies the treatment that is indicated. Students who are deficient in simple arithmetic are not likely to benefit from lectures on the p_H of solutions or in logarithmic variations.

Under the present conditions this quite elementary book may be used as a review by students in the basic medical sciences. One or two weeks might be spent on it as a review, with profit. If more time is needed, the students are hopelessly incurable.

The content of Pharmacology and Therapeutics is too meager to deserve the title. The U. S. P., N. F., N. N. R. and Useful Drugs are given as references.

Communicable Diseases for Nurses. By Albert G. Bower, A.B., M.S., M.D., Head of the Department of Communicable Diseases and Clinical Professor of Medicine, University of Southern California, Los Angeles, and Edith B. Pilant, R.N., Director of Nursing, Los Angeles County Hospital, with the assistance of Wilton L. Halverson, M.D., D.P.H., State Director of Public Health for California. Fifth edition. Cloth. Price, $3. Pp. 592, with 83 illustrations. Philadelphia & London: W. B. Saunders Company, 1943.

Although the book is intended primarily for the nurse, its scope should make it useful also for the medical student and practicing physician. Nursing procedures are given in detail and all the common communicable diseases are presented concisely with references at the close of each chapter. Many additional infections less often encountered in this country but now of special interest because of war conditions receive attention. There are chapters concerning yellow fever, malaria, dengue plague, cholera and typhus. Of the total fifty-seven chapters fifty-one relate to different diseases. Among the others is an excellent discussion of the sulfonamides in this edition. Numerous illustrations and fever charts are of added value and a glossary of medical terms will be convenient for the student. Any one interested in communicable diseases will appreciate the authors' work and the manner in which it is presented by the publishers.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

HEADACHES ASSOCIATED WITH PREGNANCY AND ENDOCRINE THERAPY

To the Editor:—A white married woman aged 32 has complained of frequent headaches for the past ten years. These attacks have had no definite association with the menstrual flow as to the time of their occurrence. The sinuses were found to be involved at one time, but these show no disease at present that can be demonstrated by x-ray or physical examination. There has been slight hypotension, and a basal metabolic rate of minus 10 has been obtained on two occasions. During two pregnancies there has been complete relief from headaches after the third to fourth month. These did not return until a month or so following delivery in each instance. This suggested the possibility that relief might be obtained by the use of endocrine therapy, but I have been somewhat uncertain which would be the best preparation to employ. Fairly immediate relief of the individual attacks is obtained by the use of small injections of ergotamine tartrate.

Major, M. C., A. U. S.

ANSWER.—The fact that an illness is relieved during pregnancy does not necessarily imply that endocrine preparations will relieve the illness during the nonpregnant state. During gestation there is a pronounced and progressive increase in the amount of estrogen in the circulating blood and in the urine throughout the entire ten months. In addition there is a precipitous increase in the amount of gonadotropic hormone during the first two months of pregnancy, a gradual drop during midpregnancy and then another moderate increase toward the end of pregnancy. The available commercial preparations of pituitary are in general unsatisfactory. Of the estrogens there are many excellent and potent products. However, the administration of even large amounts of estrogen has failed to relieve women of ailments which spontaneously remain in abeyance during pregnancy. Such therapy has been tried for women afflicted with migraine, asthma and other conditions which were troublesome in the nonpregnant state but absent during gestation. Unfortunately, the results have not been satisfactory.

A diametrically opposite type of treatment has also been tried. Some women with migraine who were free of the affliction during one or more pregnancies have been castrated by roentgen therapy in the hope that elimination of ovarian function would cure the migraine. The results have been disappointing.

TACHYCARDIA, TUBERCULOSIS AND ALTITUDE

To the Editor:—A man aged 32 with moderately advanced bilateral pulmonary tuberculosis has been at complete bed rest for the past two years. His pulse on waking is 78-84; it regularly increases to 102-106 during the day, and if he sits up in bed in the evening it goes to 116-120. A few extra-systoles are present but no murmurs or cardiac enlargement; the red count is 5,600,000, white count 8,000, hemoglobin 103 per cent, blood pressure 118/85, maximum daily temperature 99.6 F. According to a tuberculosis specialist his tuberculosis is "insufficient to account for the tachycardia and may be due to a slight degree of hyperthyroidism." Blood cholesterol is normal. The patient desires to continue his treatment in Colorado or New Mexico and wishes to live in one of three towns situated at 4,900, 5,900 or 6,400 feet altitude. To reach the first would necessitate passing through (by train) elevations as great as 8,000 feet. His present altitude is 1,000 feet. Should his journey be broken to allow him to adjust to the increasing elevation and if so how often and for how long should each stopover be?

M.D., Oklahoma.

ANSWER.—Under the circumstances there need not be undue concern regarding the change of altitude. The patient may go direct to his destination. There will be no doubt a slight increase in the symptoms for a short while, but an adjustment will soon occur as it has with the thousands of other tuberculous patients who have made a similar change in altitude over the last fifty years. It would seem highly desirable that the diagnosis should be cleared before any move is made. Hyperthyroidism should be found if present. The same may be said with respect to severe cardiac or other common conditions.

The whole process, however, may be only tuberculosis. It is well to bear in mind that with all the facilities available one cannot see all tubercle-bearing tissue in the body and that sometimes small pulmonary lesions may be associated with extensive hilus lymph node and extrathoracic involvement. As long as symptoms are present the patient should receive treatment in anticipation of the healing of "occult" lesions even if the visible lesions have disappeared.

PROPYLENE GLYCOL NOT BACTERICIDAL IN CIGARET SMOKE

To the Editor:—Because glycerin is more important in making explosives than in keeping tobacco moist, the humectant now used in many cigarets is diethylene glycol or a derivative thereof. As propylene has been shown to be of value in keeping down the bacterial content of air, is it likely that its use in cigaret tobacco might be similarly effective in the upper respiratory tract?

M.D., Massachusetts.

ANSWER.—The vaporization of propylene or any other glycol in a burning cigaret would have no effect on bacteria in the respiratory tract for the reason that propylene glycol is not bactericidal in dilutions of less than approximately 50 per cent. The reason propylene glycol vapor is bactericidal in such minute concentrations in the air is that the molecules of the glycol striking the small bacteria-containing droplet quickly build up a concentration of glycol within the droplet of 50 to 80 per cent. To produce such a concentration of propylene glycol in the fluid on the surface of the respiratory mucosa would require a relatively enormous amount of glycol—much more than could be inhaled even by breathing a fog of this substance.

CORONARY HEART DISEASE IN PAINTER AND LEAD IN TISSUES

To the Editor:—A white man aged 36 was suddenly seized with severe precordial distress. Physical examination did not reveal any abnormal findings. The pain was diffusely spread over the left side of the chest and was not helped by hypodermic morphine and papaverine. He died suddenly about four hours after the onset of the angina. At times, when the pain was not so severe, his blood pressure was taken and was found to be 150/110 mm. of mercury. Questioning was limited but it did reveal that he had been a painter for sixteen years and during the past few years had been troubled frequently by diffuse headaches. At autopsy a severe degree of atherosclerosis of the coronary vessels was found. At one point this sclerosis almost occluded the right coronary artery 1.5 cm. from its origin. Microscopic study did not reveal any significant degeneration in the heart, kidneys, liver or brain. However, chemical analysis of the various organs for quantitative lead revealed the following values:

	Mg. per 100 Cc.
Liver	0.61
Vertebra	3.16
Brain	0.197
Blood	0.043
Intestinal contents	0.517

The problem which presents itself is to determine, if possible, the relationship between the increased amounts of lead present in his tissues, his occupation and the coronary sclerosis and coronary spasm. Did the postmortem findings prove or disprove the question of occupational disease?

M.D., New York.

ANSWER.—This man died probably as the result of a rather extensive degree of coronary heart disease. In all probability he would have had angina pectoris on effort before his death if he had exerted himself; quite likely he did have angina pectoris.

It is improbable that his occupation as a painter and the lead found in his various tissues had any direct relationship to his coronary heart disease. Only rarely indeed is a history of exposure to lead found in patients with angina pectoris and coronary heart disease even at his age, and it is uncommon for young painters to have angina pectoris. Lead does not actually predispose to arteriosclerosis. Dr. Joseph Aub in his monograph on lead, pages 71 and 72, refers to a painter who was killed while at work by a fall and who showed much the same concentration of lead in his tissues: liver 0.68, skeleton 7.16, brain 0.22 mg. per hundred cubic centimeters. He had always been well and there had been no symptoms.

Dr. Aub has commented on the concentrations of lead in the case presented in this query. He thinks that the concentrations are not high enough to justify the diagnosis of active lead poisoning, being simply representative of a painter who has absorbed some lead.

SUDDEN DEATH AND ANESTHESIA

To the Editor:—On page 1215 of The Journal of Aug. 21, 1943, the statement is made that "acapnia or depletion of carbon dioxide can cause death only through the failure of breathing." On the contrary, such acapnia as is caused by irregular ether anesthesia, as in the case under discussion, is generally due to failure of the circulation. I demonstrated this in many papers in the *American Journal of Physiology* and some in The Journal which are summarized with full references in my book "Adventures in Respiration: Modes of Asphyxiation and Methods of Resuscitation," published by Williams & Wilkins Company, Baltimore, 1938.

If that patient had been treated with carbon dioxide and oxygen she would almost certainly be alive today.

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